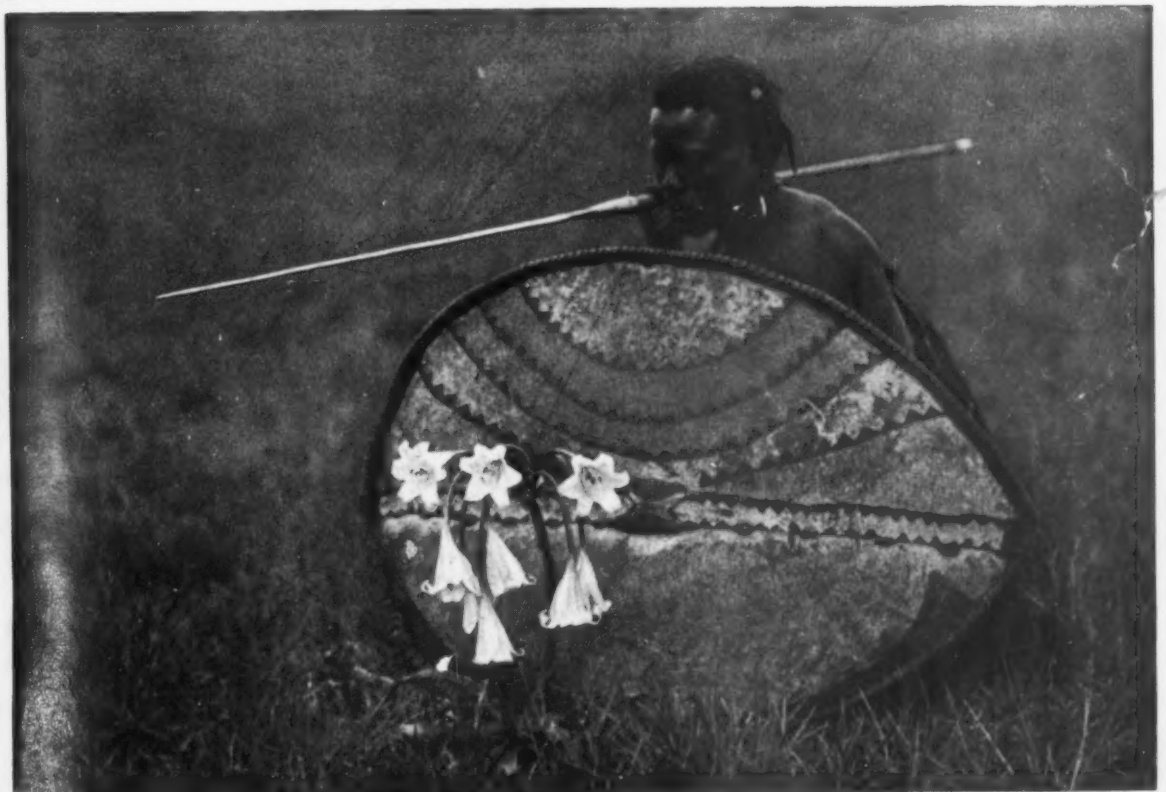


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THE AMERICAN MUSEUM JOURNAL



GAME GARDEN OF THE WORLD—IN AFRICA
WITH ROOSEVELT, AKELEY AND DUGMORE
PROGRESS: A DRAMA OF EVOLUTION
INTERSTATE PALISADES PARK

The American Museum of Natural History

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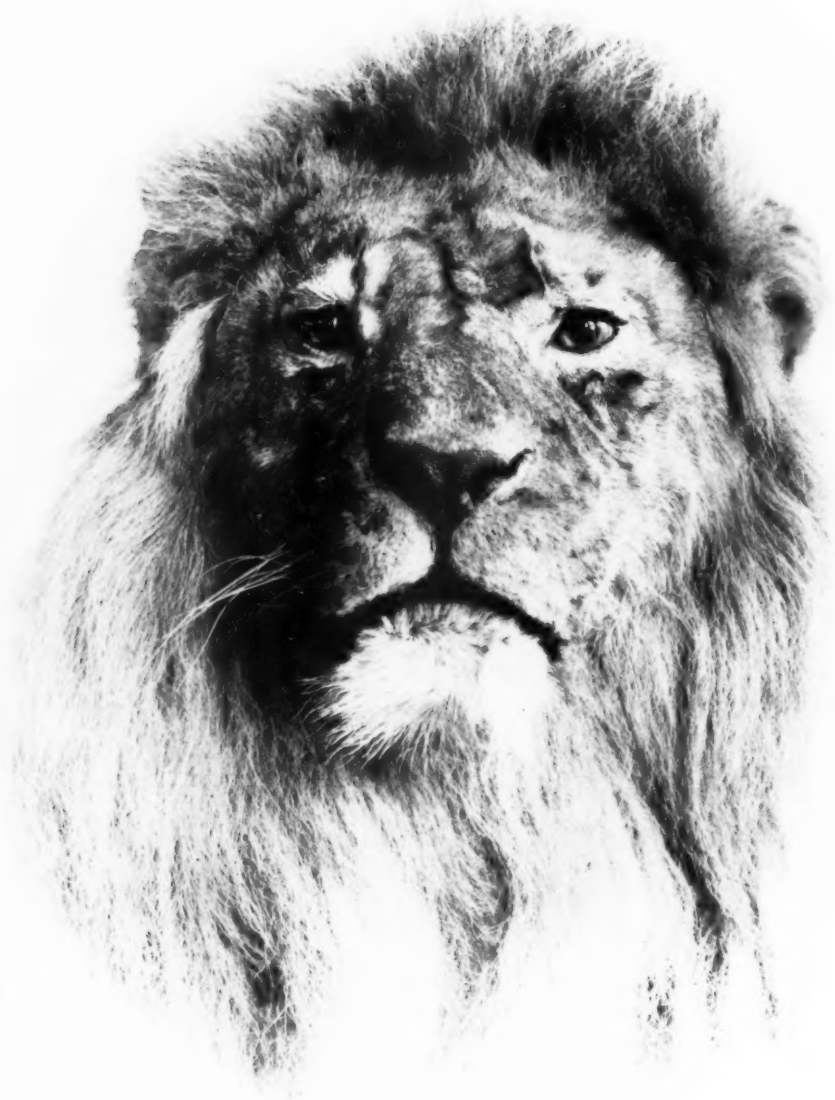
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MARY CYNTHIA DICKERSON, *Editor*

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A RESIDENT OF AFRICAN WILDS

The lion "Hannibal" who lived at the New York Zoological park from 1902 to 1906. After his death the skin was mounted for the American Museum by Mr. James L. Clark and is now on exhibition on the third floor at the entrance to the synoptic mammal hall. The photograph is from the mounted Hannibal

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East Africa — Game Garden of the World

A REVIEW OF ROOSEVELT AND HELLER'S *LIFE HISTORIES OF AFRICAN GAME ANIMALS*¹

By C. HART MERRIAM

Illustrations chosen by the Editor from the photographs, drawings and maps in the Roosevelt and Heller volumes and from cartoons of Roosevelt in McCutcheon's *In Africa*

IN North America less than a century ago the western plains supported vast herds of big-game animals — antelope, buffalo, elk, and mule deer — accompanied by bands of hungry wolves and usually also by a few grizzly bears. But the steadily increasing pressure of armed explorers, hunters, and fur traders, followed by stockmen and later by ranchmen, told heavily on the wild game, until at present antelope, except in the Yellowstone National Park, are reduced to a few small bands; the buffalo as a wild animal, except in the Yellowstone and the Canadian Northwest, has ceased to exist; the Plains grizzly has been exterminated; the elk and mule deer have been forced back into the less accessible parts of distant mountains or have taken refuge in our national parks, while of the original Plains animals the wolf alone remains in material numbers — and he has altered his habits to meet the changed conditions, keeping out of sight

in the daytime and preying at night on the settlers' cattle in place of the buffalo of bygone days.

In other countries, including South Africa, the course of events has been much the same. But in East Africa, owing partly to the astonishing tardiness of exploration and settlement, and partly to the foresight of the British Government in setting aside large areas as game preserves, wild beasts are still to be found in amazing abundance. The number of kinds is no less surprising than the number of individuals. Nowhere else on the globe exists an assemblage of game animals in any way comparable; indeed, the number is almost beyond belief. For instance, not fewer than thirty species of antelopes, gazelles, steinboks, hartebeests, elands and their allies, inhabit the region at the present time, besides giraffes, zebras, buffalos, elephants, rhinoceroses, hippos, lions, leopards, cheetahs, jackals and hyenas.

During the past half century this surprising wealth of game animals has attracted hunters from all quarters of the globe. In the comparatively brief period between the discoveries of Speke and Grant and the hunting expeditions of Selous, Harry Johnston, and Roosevelt,

¹ *Life Histories of African Game Animals* by Theodore Roosevelt and Edmund Heller, with illustrations from photographs, and from drawings by Philip R. Goodwin; and with 40 faunal maps. 2 vols. New York, Charles Scribner's Sons. 1914.

The account of the expedition, entitled *African Game Trails*, by Theodore Roosevelt, was published four years earlier (Scribner's 1910) and to lovers of wild nature is a book of thrilling interest.



*Photo by Carl E. Akeley
Reproduced through courtesy Charles Scribner's Sons*

IMPALLA ANTELOPE ON THE TANA RIVER

Among all the horned animals of middle Africa the impalla is the one which, when alarmed, takes the most extraordinary leaps and bounds; the animals go off almost like birds, springing over bushes, or many feet into the air if in the open



By courtesy Charles Scribner's Sons

DISTRIBUTION OF THE RACES OF THE WHITE RHINOCEROS

The localities occupied by this species are everywhere bounded by rivers. The Nile race (2 on the map) (*Ceratotherium simum sinum*), the only one which still exists, is confined to a limited district west of the Nile and is never found on the east bank; while the southern race (1 on the map) (*Ceratotherium simum coltoni*), formerly very abundant between the Zambesi and Orange Rivers — although now represented only by some dozen preserved individuals — has never been known to occur north of the Zambesi. The river boundaries illustrate forcibly the strong aversion of these great quadrupeds to crossing streams. During historic times the white rhinoceros has not been known to inhabit the region between its present ranges, although this is apparently well suited to its habits, and the separation must have been comparatively recent, since the races exhibit only slight structural differences.

Roosevelt and Heller's *Life Histories of African Game Animals* contains some forty maps setting forth the distribution of the big game of the continent

a literature on African game has sprung up and grown to voluminous if not formidable proportions. It has remained however, for Roosevelt and his field assistant Heller, as a direct outgrowth of the Smithsonian-Roosevelt African Expedition to write the *Life Histories of African Game Animals* — a book which for all time will stand as a treasure house of information on the geography and general natural history of the region.¹

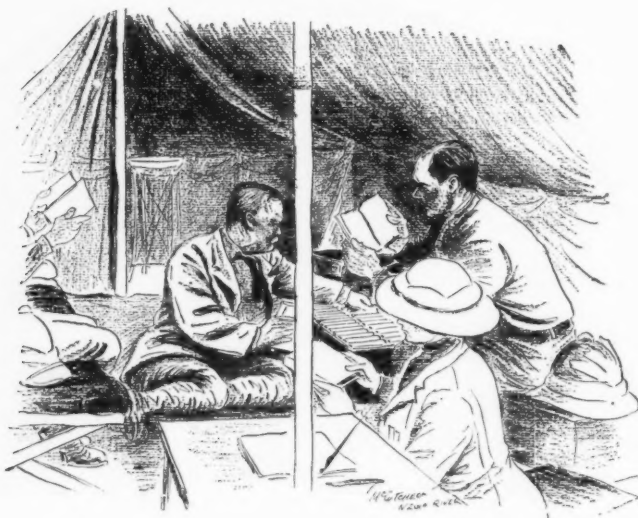
In training, field experience, knowledge of animals, and in literary ability, the authors form a rather remarkable combination. Roosevelt had long been recognized as the most pleasing writer and highest authority on the habits and hunting of the big-game animals of North America; Heller had attained the reputation of being one of the world's most

experienced and successful mammal collectors, having previously worked in East Africa (on the Akeley expeditions), and in western North America from Alaska to the deserts of Southern California and Nevada. Hence in the writing, the life histories naturally fell to Roosevelt; the account of geographic ranges and the descriptions of species to Heller.

In the preface and early part of the book the authors outline the routes and geographic areas covered by the expedition, describe the natural features and dominant elements of the flora, give an admirable summary of the history of east and middle Africa, mentioning the accomplishments of successive explorers and hunter-naturalists, and digress far enough to discuss such general subjects as game preserves, the geographic distribution of animals, the systematic relations of genera, species and subspecies, the derivation of the fauna geographically and paleontologically, and the theories of concealing and revealing

coloration in relation to natural selection.

Whether or not one always agrees with their conclusions it must be admitted that the discussions abound in interesting observations and entertaining comments and deductions. In many instances fundamental scientific truths are expressed with more than ordinary clearness. Thus, in speaking of the ranges of animals and plants we are told that every species has a tendency to enlarge



From McCutcheon's *In Africa*
By courtesy Bobbs-Merrill Company

Roosevelt showing his pigskin library to John T. McCutcheon. Fred Stephenson and Mrs. Carl E. Akeley in the Roosevelt African camp



WHITE RHINOS SHOT BY THEODORE ROOSEVELT

[] This group, showing the White Rhinoceroses of Africa, is made from skins collected on the Smithsonian-Roosevelt African Expedition, and mounted for the National Museum by James L. Clark



From McCutcheon's *In Africa*
By courtesy Bobbs-Merrill Company

Improving each shining hour

its area of distribution, and that "the distribution of each species marks the limits within which it is able successfully to compete with its environment. It would appear therefore a comparatively easy matter to determine the factors which are accountable for the distribution of any species; and yet no task in natural history is more difficult... The distribution of one species may depend upon the distribution of its food plants or animals, of another upon its natural enemies, of another upon climatic conditions; while yet others may be limited in distribution by natural boundaries such as large bodies of water or high mountains."

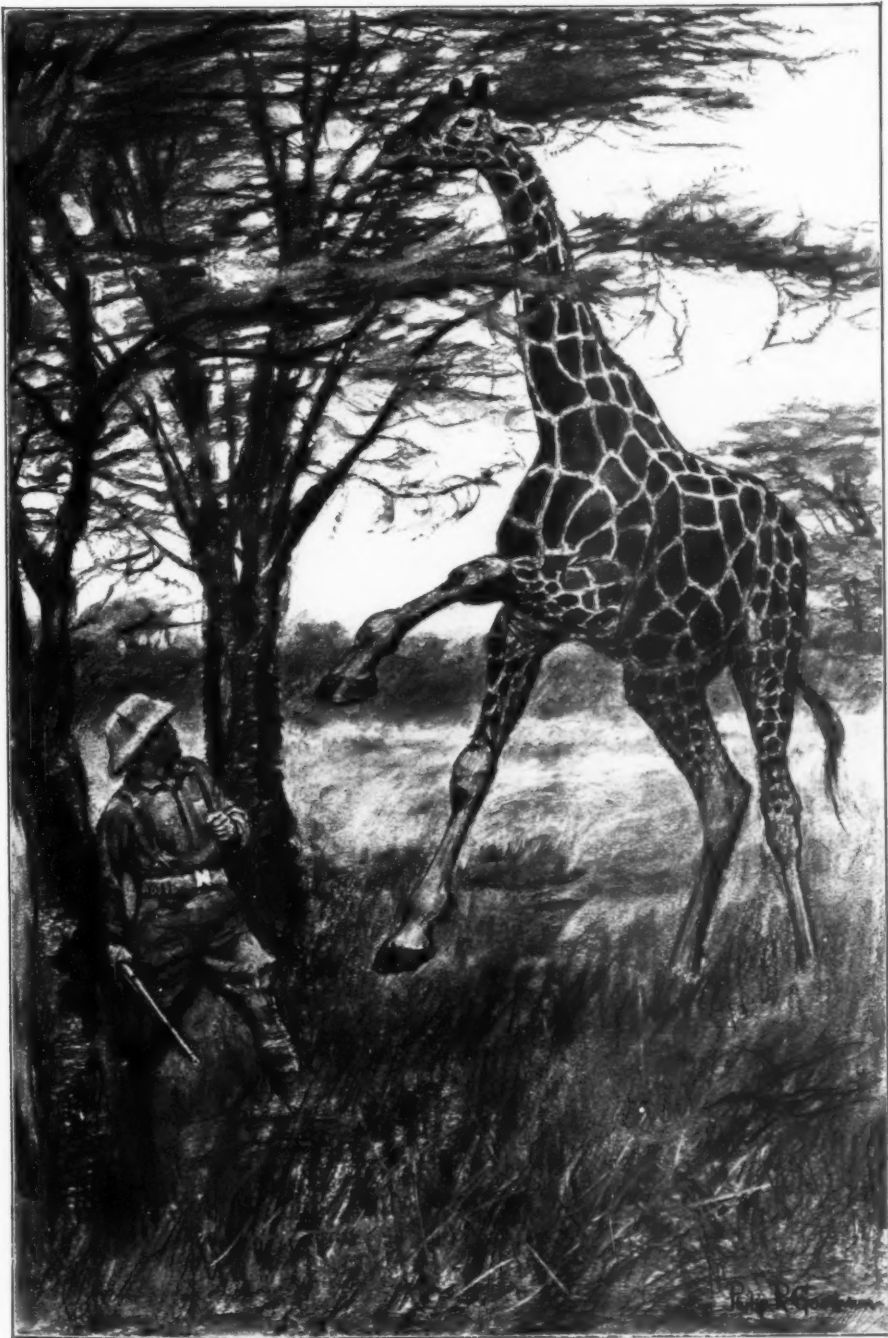
Later, the authors mention the physical obstacle imposed by the Tana River, which "acts as a barrier across the desert portion of the coast slope from Mount Kenia eastward to the sea," separating the ranges of a dozen game animals,

including zebras, giraffes, oryx, hartebeests, gazelles, antelopes and wart hogs. One's surprise at the effectiveness of a river barrier is relieved by the remark that "the aversion which most antelopes have for crossing rivers is due no doubt chiefly to the fear of attack by the crocodiles which haunt the streams."

Throughout the work the animals are discussed with reference to their environment — the features imposed by geography, vegetation and climate being kept constantly in mind.

We are told that the mammals of equatorial Africa, unlike those of northern regions, "have no definite season for shedding their coats, nor are they subject to any seasonal climatic change which would necessitate such a change." And further, that there seems to be no definite breeding season in East Africa, there being "no climatic necessity for such a habit."

Roosevelt's writings on North American game animals have proved him an unusually keen and accurate observer, eager to learn just what the animals are doing, and certain to record what he has seen while it is still fresh in mind. Hence it is not surprising that his accounts of hunting strange beasts in a new field, as told in his *African Game Trails* and *Life Histories of African Game Animals*, should abound in detailed observations, often enlivened with spirited scenes and thrilling incidents.



*Drawing by Philip R. Goodwin
Reproduced through courtesy Charles Scribner's Sons*

DEFENSIVE ACTION OF RETICULATED GIRAFFE

Giraffes make no effort to hide or escape observation, trusting to their own wariness, speed, and keen senses, especially sight, for protection. With the exception of the ostrich, giraffes are the wariest game in all Africa and hardest to stalk. This one was caught asleep by Colonel Roosevelt. When he was within a few feet of it, it reared and struck short and finally withdrew. The lion is the giraffe's only enemy among beasts



*Drawing by Philip R. Goodwin
Reproduced through courtesy Charles Scribner's Sons*

BLACK RHINOCEROS TOSSING A PORTER

The hook-lipped black rhinoceros is dull of wit and of eyesight, but its senses of smell and hearing are good. The sight of a man usually induces only bewilderment and curiosity; if the man is smelt, fear is the usual result; but in some cases either the sight or smell of a man arouses senseless rage

Heller's descriptions of the animals are clearly stated, easily understood, and may be regarded as models of their kind. The matter relating to geographic ranges has been written from the vantage ground of familiarity with the species both in life and in literature, and the text is supplemented by a series of maps showing graphically the areas inhabited. There are no fewer than forty of these maps, constituting, it is hardly necessary to add, a most valuable feature of the work.

Another commendable feature is the publication of the native names of the animals in the languages of several tribes. These names sooner or later are sure to be of assistance to ethnologists and are likely to be the means of avoiding errors in the transcription of animal myths and tales, for unhappily, ethnologists are seldom naturalists.

Heller has enjoyed rare opportunities and has accomplished what no other naturalist ever attempted; for in addition to the six hundred specimens of some seventy species brought back by the expedition, he has studied the W. L. Abbott and Paul Rainey African collections in our National Museum, the collections of the American Museum of



From McCutcheon's *In Africa*
By courtesy Bobbs-Merrill Company

Writing his adventures while they're hot!

Natural History in New York, the Field Museum in Chicago, the Powell-Cotton collection in England, and the rich collections in the national museums of Great Britain, Germany, Belgium and France.

In comprehensiveness, thoroughness, popular interest, and in the scientific value of its contributions to knowledge, the *Life Histories of African Game Animals* is far and away the best book ever written on the big-game animals of any part of the world.

¹The cartoons from J. T. McCutcheon's *In Africa* were chosen by the Editor to give, in the first and second, a flavor of the African camp, and in the third, to emphasize one of the most important principles in all natural history field work, namely — that for the sake of accuracy, observations should be recorded at the moment they are made, or at least "while they're hot."



Photo by A. Radclyffe Dugmore

RHINOCEROSES ON THE PLAINS OF KIU

Game is so thick in this good grazing region that we were glad to use an old *boma* of the chief game warden, barricaded with a heavy stockade of thorn branches. A circle of fires around a camp will protect against lions, leopards and other animals, but a rhinoceros may charge through fire. These huge creatures in family groups of two or three, never in herds, look like scattered rocks in the distance



Photo by James L. Clark

Before crossing, stones are thrown into the water to drive away crocodiles, and an occasional rifle shot on either side helps to protect the cavalcade. The more dangerous rivers are waist deep and many an unwary boy going down for water gets caught by a crocodile

Pioneer Photography in Africa

A STORY OF THE WORK OF A. RADCLYFFE DUGMORE IN SECURING FOR AMERICA THE EARLIEST FINE SERIES OF AFRICAN WILD GAME PICTURES

By JAMES L. CLARK

WE sat outside our tent smoking, and sipping the last of our coffee. The air was soft and balmy. There was not the hum of a single insect nor the sting of a biting ant. Soft light was flooding the plains of Kiu, which lay before us like a rolling sea with the full moon just lifting from the horizon. "And this is Africa — how different from what we expected!" As Dugmore spoke these words I roused from my silent wonderment at it all.

This was our first camp in the land of sun-scorched plains. We had expected that by nightfall the insect pests would be unbearable and that to walk about

outside our tents would mean to render ourselves liable to the bites of poisonous insects and lurking snakes or to the germs of the malaria-laden mists.

But we found these all absent and so, as the big moon ascended high and grew brighter and brighter we watched and marveled until, drowsy with the weariness from our previous days of preparation and the afternoon's journey in the little toylike train, we reluctantly turned to our cots to wait for the morrow.

By the first sign of light in the eastern sky breakfast was finished, the tents down and all the loads packed. A circle of little fires showed where the

porters' tents had been, and about these huddled the half-naked boys in the cool of the early dawn, waiting for daylight to appear that we might march on in safety. As dawn broke, the unbounded plains of the night before seemed like another land; and our guide pointed to a little blue hill topping the horizon to the south and said, "Sisi kwenda huku" (We are going there.)

When our day's march ended we had covered about twenty miles and were then camped at the only water hole in the bottom of a dry river bed. Our

tents were pitched some hundred yards back, that we might not disturb the animals which were in the habit of drinking at the hole in the night.

Dugmore, after months of preparation in New York and London, had assembled a wonderful outfit of cameras and all the necessary paraphernalia for developing and for making prints in the field, whether by running brook or muddy water hole, and his success was due as greatly to developing immediately and knowing whether or not he had his picture before he turned his attention to

other things, as it was to his ability and technical knowledge as a photographer. The advantage of developing at once while there is time and opportunity to take the picture again if necessary, rather than bringing the undeveloped plates home and then developing, is manifold. It insures against loss through plates and chemicals going bad under unfavorable conditions; against loss of plates through the camera having sprung a leak unnoticed; against wasted effort through over or under exposure and many other conditions, any one of which might make the result a failure.

We had brought with us only such guns and ammunition as seemed necessary to insure our safety, as it was not for animal trophies we had come but for photographs.



Messrs. A. Rudelyffe Dugmore and James L. Clark on the way to Africa



Photo by James L. Clark

First steps in constructing a *boma*. Heavy logs and sticks, lashed together with thorn tree bark, make a substantial cage, over which thorn branches are densely packed to form a barrier and to conceal the operator. The dry river bed was a runway for lions, which came to a water hole just below the *boma*.

Field photography is most fascinating when resources are taxed and one's versatility is called upon to secure results. The success with which Dugmore overcame obstacles is shown in his marvelous photographs. At that time (1909) no such series of African wild-game pictures had reached America. Eliminating Schilling, the German sportsman and author, who took some interesting, but photographically poor, game pictures in German East Africa, Dugmore was perhaps the pioneer in the African field of animal photography.

From our camp we worked the water hole at night and the



Photo by James L. Clark

This lion came stalking the dead zebra in the night, but the flash light missed fire and it was necessary to shoot him when he was about twelve yards distant.

outlying country in the daytime. Each evening Dugmore set his flash-light cameras at this water hole; these were controlled on an electric circuit which tripped the cameras and fired the flash simultaneously — and it was here that we had some of our most disheartening trials. Before leaving at dusk we would make repeated tests of the working order of cameras, batteries and flashes, but

we were at a loss to understand this mystery, but finally concluded that the night birds in flying down and skimming the surface of the water as they drank, hit the string and fired the flash, but since they were going at considerable speed failed to leave a record on the plate.

This, with the fact that one night two lions had rolled in the sand directly on



Photo by A. Radclyffe Dugmore

Lion with broken back impotently snarling.— When waiting in a blind for antelope Mr. Dugmore suddenly found himself stalked by two lions eighty yards away, and was obliged to use a rifle instead of a camera, breaking the back of one and knocking the other over

afterward they would fail to act just at the very moment when tripped by some night prowler.

For about ten days we were baffled by most peculiar results. On several mornings we found the flash fired and upon developing the plates discovered a perfect picture of the water hole itself, but not the slightest sign of the creature that had tripped the camera. For days

the thread and that another time three rhinoceroses had come down to drink and, although stepping on the thread, had failed to trip the switch, led Dugmore to abandon the automatic principle and adopt the method of sitting up and watching from a near-by tree or constructed blind — the method by which he finally secured his flash-light pictures of lions and antelope.

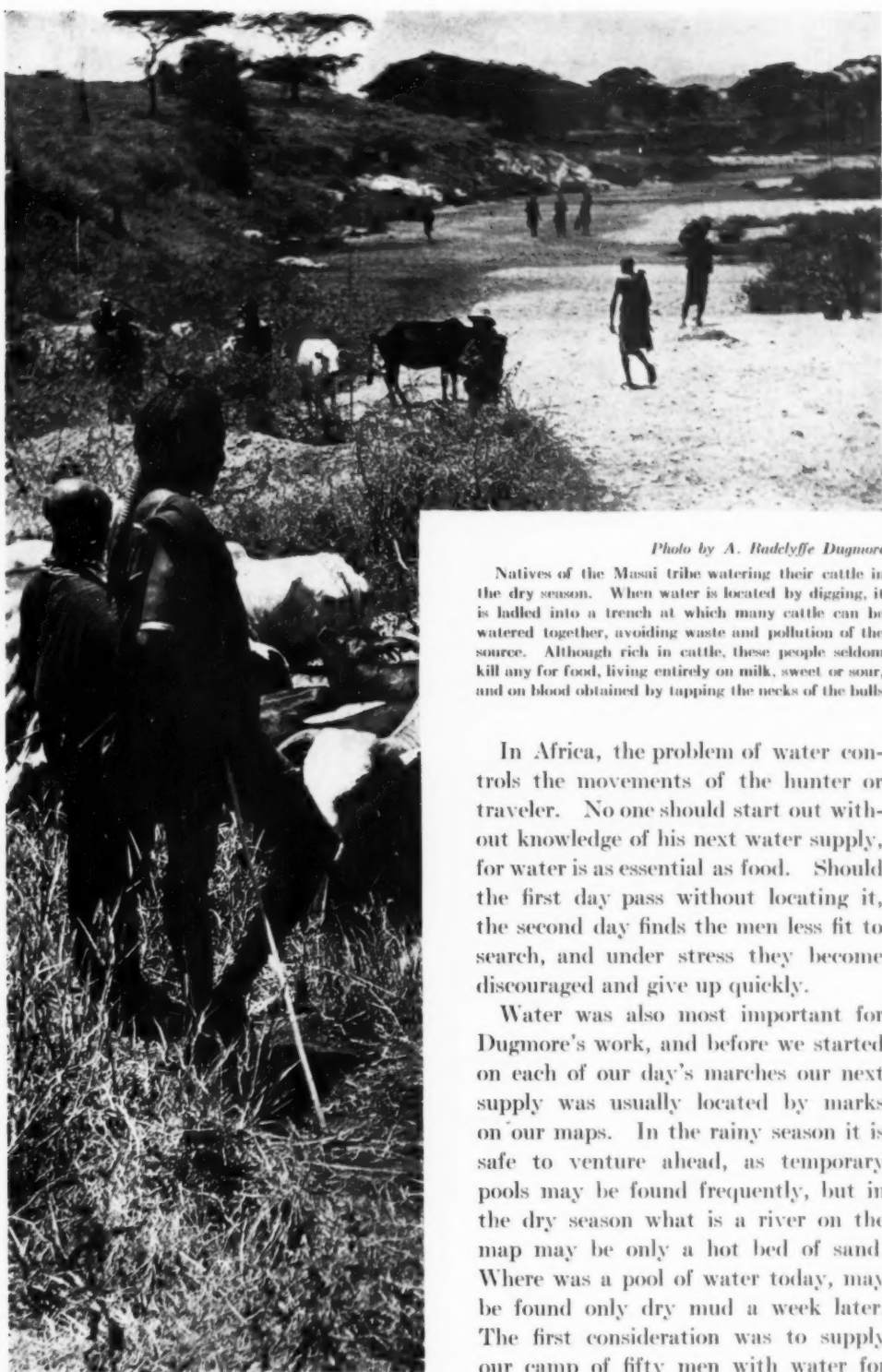


Photo by A. Radclyffe Dugmore

Natives of the Masai tribe watering their cattle in the dry season. When water is located by digging, it is ladled into a trench at which many cattle can be watered together, avoiding waste and pollution of the source. Although rich in cattle, these people seldom kill any for food, living entirely on milk, sweet or sour, and on blood obtained by tapping the necks of the bulls

In Africa, the problem of water controls the movements of the hunter or traveler. No one should start out without knowledge of his next water supply, for water is as essential as food. Should the first day pass without locating it, the second day finds the men less fit to search, and under stress they become discouraged and give up quickly.

Water was also most important for Dugmore's work, and before we started on each of our day's marches our next supply was usually located by marks on our maps. In the rainy season it is safe to venture ahead, as temporary pools may be found frequently, but in the dry season what is a river on the map may be only a hot bed of sand. Where was a pool of water today, may be found only dry mud a week later. The first consideration was to supply our camp of fifty men with water for

drinking and cooking; the second to supply water for developing and printing. For drinking purposes all water had to be boiled; for developing, it only had to be reasonably clean. We considered ourselves fortunate if we could camp by a running stream, but this was only occasionally possible as our camps were controlled by the presence of game as well as of water. Many times we saw abundance of game which Dugmore wished to photograph, but as we could not locate water in the vicinity we had to move on.

On several occasions we were obliged to dig for water because we wanted to be at a certain point of vantage from which we could get to the herds of game. This method was not always successful, and where water could be had under these conditions it was always scanty and had to be used most sparingly. Each night it was covered with branches of thorn trees to protect it from the animals which would otherwise have come and exhausted the supply, for as a rule it seeped in very slowly and could be taken out only in small quantities at a time. Under such conditions developing was out of the question and our plates were allowed to accumulate until camp could be moved to some stream, where for a day or two we would make a business of developing.

Our first serious difficulty was the frilling of the plates by the warm water. Dugmore overcame this by filling buckets with water the last thing in the evening and allowing them to stand all night. Then in the morning at about four o'clock, the coolest time in the twenty-four hours, we would develop the plates. By daylight these plates would be drying and by eight o'clock they would be so dry that the heat that came with the forenoon sun would not affect them.

This arrangement also left us free at

the proper time for taking pictures, which is between nine and eleven o'clock in the morning and between two and five in the afternoon, when the light is good and the animals are moving about feeding. In the middle of the day, from eleven to two o'clock, the heat rays dance so that a picture at a hundred yards is almost impossible, and this period of direct rays of the sun is so hot that the animals take to shelter, resting under trees and in strong shadow where photographing is quite impossible.

Dugmore was tireless, and would obtain results where results were apparently unobtainable. I have seen him after being out all night in a *boma*, return for breakfast and immediately thereafter start out for pictures, perhaps to wait with patience all day long for antelopes to feed slowly in his direction, or to stalk with his heavy camera across the hot barren plains.

It was while he was working in a little leaf concealment at noon one day not far from camp, waiting for antelope to appear, that he chanced to look behind and saw two lions stalking him. His first thought was a picture and he reached for his camera, but the deliberate stealthy progress of the two beasts made him change the camera for his gun. He broke the back of one and knocked the other over, but this second one finally got away. The first, powerless to move, was then photographed at close range.

Photographing lions proves most successful if one can find a fresh kill and construct a *boma* near it during the day, being careful not to touch the kill or to go near it. The lion — or leopard perhaps — is almost certain to return the following night. It was this method which secured for Dugmore his lion pictures taken at about thirty feet from the animal.

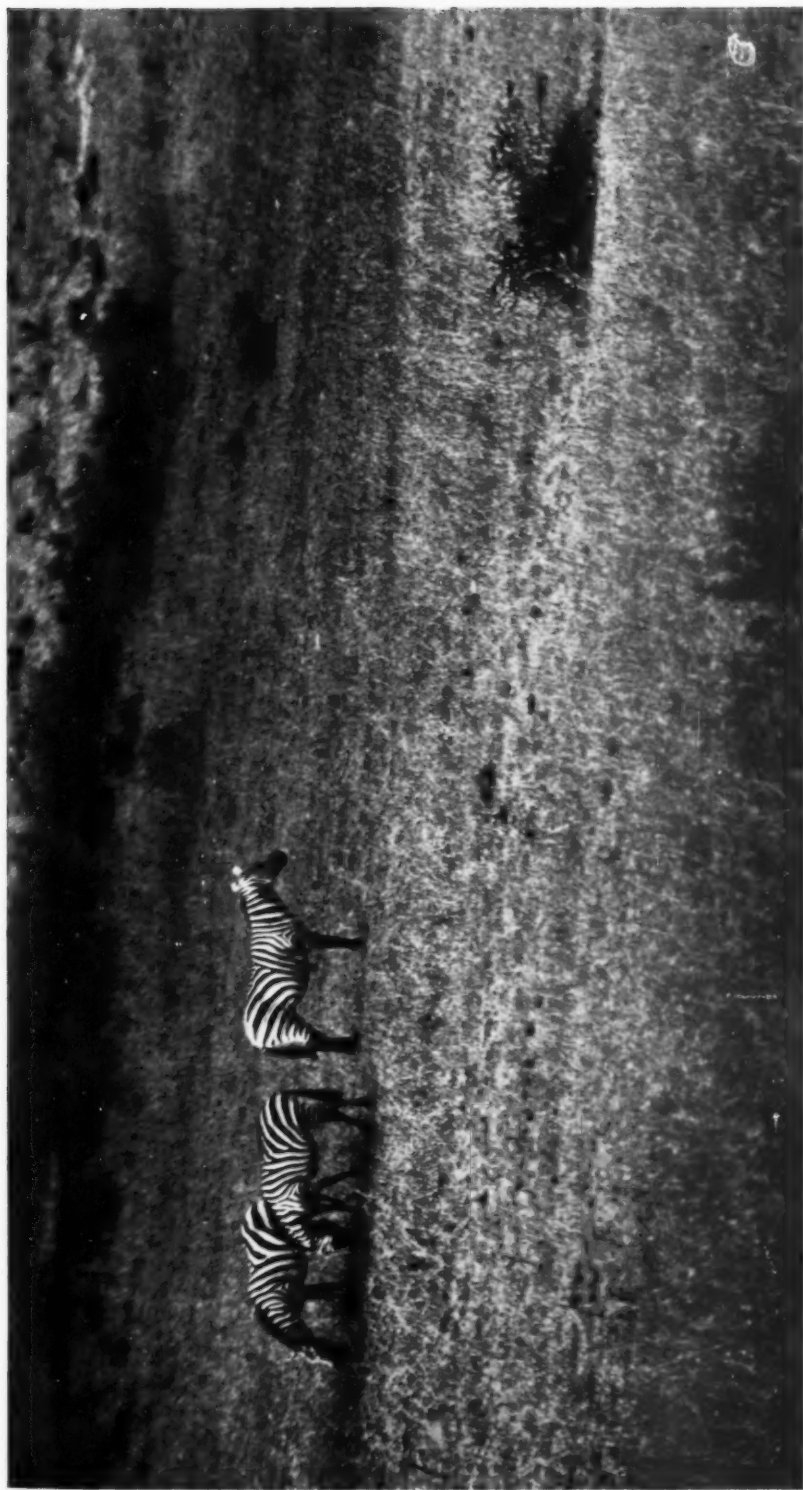


Photo by A. Rudolphe Dugmore

ZEBRAS GRAZING ON THE ATHI PLAINS, NEAR NAIROBI

Except the hartbeest this is the most common animal in Africa, generally found in herds of one hundred or more. It also herds with giraffes, hartbeest, wart hogs, buffalo and other game, no other animal being so variously gregarious. The stallions of this species are fierce fighters, so that it is almost impossible to get an unscurred skin of a male zebra. Zebras are the favorite food of the lion and also of the native porters, being one of the few African animals whose meat contains fat. They are as harmless as ponies and an easy prey



Photo by A. Badclyffe Dugmore

DISTANT VIEW OF MOUNT KENIA AT SUNRISE

Photograph taken on the return trip from the Northern Guaso Nyiro where the fauna of Somaliland penetrates British East Africa in a long spur. Hunters visit this district to secure types of animals which can be found nowhere else in British East Africa. After chopping a way through dense forest for two days, short of food and water, we emerged on the slopes of Mount Kenia, which gave us a straight course for our post station



Photo by A. Budgeffe Dugmore

INFURIATED RHINOCEROS IN FULL CHARGE

These animals are extremely agile for their bulk — which is chiefly muscle — and can overtake a man on foot. A shot from Mr. Clark's gun turned this infuriated beast at fifteen yards. The black rhinoceros is a browser, grasping twigs and tufts of coarse grass with its prehensile upper lip. The Nile is the natural barrier between this species and the grazing white rhinoceros of the Congo. In Africa, the crocodile-infested streams keep animals distinct for thousands of years, one on either side of the same river

The next best method is to shoot a zebra, which is the lion's favorite food, and drag it some distance over the ground; then to build a *boma* or get up into a near-by tree in a constructed crow's nest. The latter is safer but not so satisfactory, for the darker the night

prepared kill stalks it and does not make the slightest sound; therefore to have knowledge of his presence is a protection as well as an advantage photographically.

Other methods used for photographing game were improvised on the spot as the conditions demanded. For hours at a



Photo by A. Radclyffe Dugmore

The hartebeest is the most common animal in British East Africa, found in herds of one to three hundred, and used extensively for food. An interesting peculiarity of this beast is that it assumes the duty of sentinel, not only for its own kind but also for all the other animals, often risking its life to warn game that is being stalked — and standing for hours perhaps on the open plain watching a photographer's blind. It is a true antelope, very swift, and has a large range

the more likely the lions are to come and nothing can be seen looking down toward the black ground from the tree; whereas looking upward from a *boma* on sloping ground the lion will be seen against the sky line, visible on even the darkest night. A lion coming to a

time we might lie in the grass or in holes we had dug in the ground or sit up in trees or in little shelters constructed of boughs, while ant hills were very useful as screens.

At one time I shot and skinned a hartebeest, the most common of African

animals, and then making a form by winding together dry grass, I stretched the skin over it. After the skin was dried for a few days, it became stiff and hard, the grass was removed, and we had a light, strong and hollow decoy hartebeest. Dugmore used this as opportunity came, getting inside with his camera and stalking game. For some reason however, the method did not prove a success; just why we could never find out.

One of the things that especially vexed Dugmore was the indifference of all the game to the natives, who could walk about the plains disturbing the animals but slightly while a white man could hardly get within gunshot. Unfortunately we had to protect our heads from the sun by big pith helmets and our bodies by a good covering of clothes, and so could not imitate natives and approach the animals in this way.

Altogether the most successful method of getting pictures proved to be patient waiting. Animals if not disturbed, stick to one locality where they make a sort of circuit. From their drinking place they go to the feeding ground, then from there to the place for the noonday rest; leaving there as the heat subsides they go to some other feeding place, then to water at dusk or later, and so on day after day. If on entering a new country one works carefully he will soon learn the times and places of feeding or resting and, by studying the wind and concealing himself carefully, will get photographs as the game comes directly toward him. Pictures thus taken are of value, as they show the animal as he really is. Driving is unsatisfactory as it gets a picture of the game in frightened and unnatural positions — and causes it to shun the locality afterward. By never frightening game one is always certain to have another chance at it.

One of our most interesting experiences was on Kamiti Plains, where we tried for a picture of a herd of the Cape buffalo. A week before us Colonel Roosevelt had secured from this herd, after considerable difficulty and great danger, a group of specimens for the National Museum. These buffalo had the reputation of being the most savage herd in the country, and, when we found them, were still living up to their reputation. Their home was in an immense papyrus swamp, the bed of which was oozy mud under about a foot of water, and a member of our party rode out along the edge of this to look for them. The buffalo were resting just inside the papyrus, and as he passed they charged out into the reeds which skirted the edge.

A hundred yards of level ground lay between us and the reeds; this had been planned so that the animals could be photographed clear of reeds when they charged into this area. Behind us were open plains without shelter, and it was evident that retreat was our safe course. Dugmore however, was determined to get a picture. With heads out straight, the herd came plowing through the reeds directly at us, but as they broke into the clearing they suddenly wheeled before they could be photographed. We could see the tops of their backs as they galloped back, until they plunged into the papyrus and disappeared. Dugmore regretted having no picture, but I was glad that our expedition had not come to a sudden end.

During our stay at the first water hole we were on the plains every day and it was here Dugmore secured his rhinoceros pictures. His anxiety for close pictures led us into some trying predicaments, and it was his good judgment as often as my big gun that got us out again.

One of our first experiences with the rhinoceroses was when we had stalked

two on the open rolling plains and they, having scented us, began to charge around looking for the trouble. Their snorts evidently aroused another who was sleeping in the grass, for in a few moments three of them were charging back and forth instead of two. The appearance of the third rather disturbed me, as I was carrying a gun with only two shots and Dugmore had nothing but the camera.

The rhinoceroses suddenly halted three abreast at only forty yards and stood there waiting for something to happen. Although this was the picture we had been running through this danger for, Dugmore showed his judgment in not snapping the camera, fearing that even this slight sound would bring the three enraged beasts down on us. As we stood motionless, Dugmore with the camera and I with the gun leveled on the head of the biggest one, our hearts going like trip hammers wondering what was to be our fate, one of the beasts wheeled and ran and the others followed immediately. The tension was momentarily relieved, but when I saw Dugmore chasing after one that had separated from the others, my anxiety returned and I followed with my big gun to protect him. The rhinoceros made better time than we could and the gap between us continued to lengthen as he made off over the plains. We gave him up and took a short cut back toward our boys, who had been in the background while we were photographing the animals.

As we topped a little knoll, we saw about one hundred yards ahead of us in the yellow grass, the black outline of a rhinoceros' back. We approached to about eighty yards off where we had a good view of him, and from this point

Dugmore took a telephoto picture. Although in plain sight we moved slowly and cautiously toward him and at about sixty yards Dugmore took another picture. Being sure of two pictures, he then changed his lens to one with a shorter focus while the rhinoceros showed no sign of knowledge of our presence. We walked to a spot about forty yards from him, where Dugmore focused the camera, while the rhinoceros deliberately lay down. This was a sure sign that we had not been detected and we both gave a sigh of relief.

Dugmore however whispered "Splendid! Now we can walk up very close without his seeing us." This was no place for an argument, so as he started forward I followed, my finger on the trigger of the gun. As each cautious step brought us closer and closer — and my breath grew shorter and shorter — I wondered if Dugmore were ever going to stop! At a little over twenty yards from the big rocklike mass he hesitated and began to focus his camera, while the rhinoceros' ears twitched nervously. My gun, which seemed to weigh many tens of pounds, came slowly to my shoulder. The next moment there was a snort, a cloud of dust, and a big rhinoceros was coming straight at us. I set my teeth, held the gun and listened for the click of the camera.

Dugmore let him get well on his feet and under way, when a "click" and a "bang" in quick succession decided the battle in our favor. At fifteen yards distance the rhinoceros bit the dust, scrambled to his feet, wheeled and made off.—It was through many such instances of daring disregard for danger that Dugmore achieved his splendid success in African game photography.

REPRODUCTION OF AFRICAN PHOTOGRAPHS

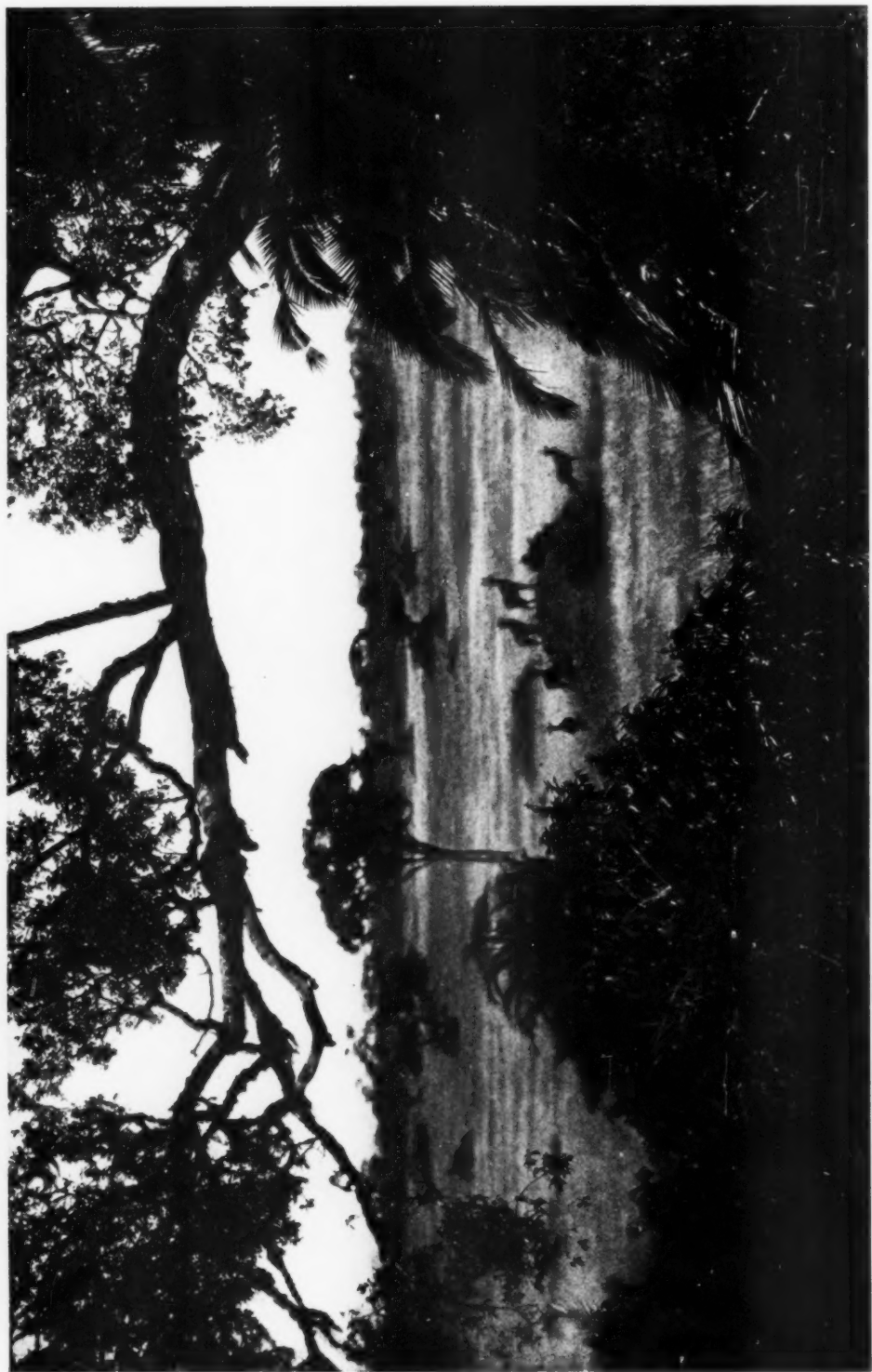
By CARL E. AKELEY

The fifteen hundred photographs brought back to America by Mr. Akeley, many of them the most remarkable elephant photographs ever taken, represent one of the minor results of the last of his three expeditions to Africa. These photographs furnish indispensable, authentic data for the preparation of the groups in the proposed African hall of the American Museum of Natural History



A CAMP OF ELEPHANT HUNTERS ON MOUNT ELGON

A clearing in the bamboo forest, at ten thousand feet elevation. Slender bamboos tower overhead and trees are festooned with gray moss. Here and there in the heart of the forest are small open spaces, so devoid of trees as to seem like artificial clearings, and the air, although cold elsewhere, is pleasant in these little open glades. Here the ground is clean, and heavily carpeted with dry bamboo leaves. There are many old elephant pits in these bamboo forests, made by the natives when elephants were plentiful on Elgon



VIEW OF THE UASIN GISHU PLATEAU FROM THE 'NZOIA RIVER

Jackson's hartebeest, the sentinel of the plateau, is keeping a lookout in the foreground. This plateau on the east of Mount Elgon, and drained by the 'Nzoia River, has long been known as a wonderful game country. The downs, over which one's gaze can stretch for fifty or sixty miles as they gently slope to the Victoria Nyanza, take on pink, mauve, gray or russet sheen as the wind bends the flowering grasses before it. The plateau is now settled by Boers from the south who are farming in a delightful climate, six to eight hundred feet above the sea—and where almost anything will grow



HIPPOPOTAMI IN THE TANA RIVER

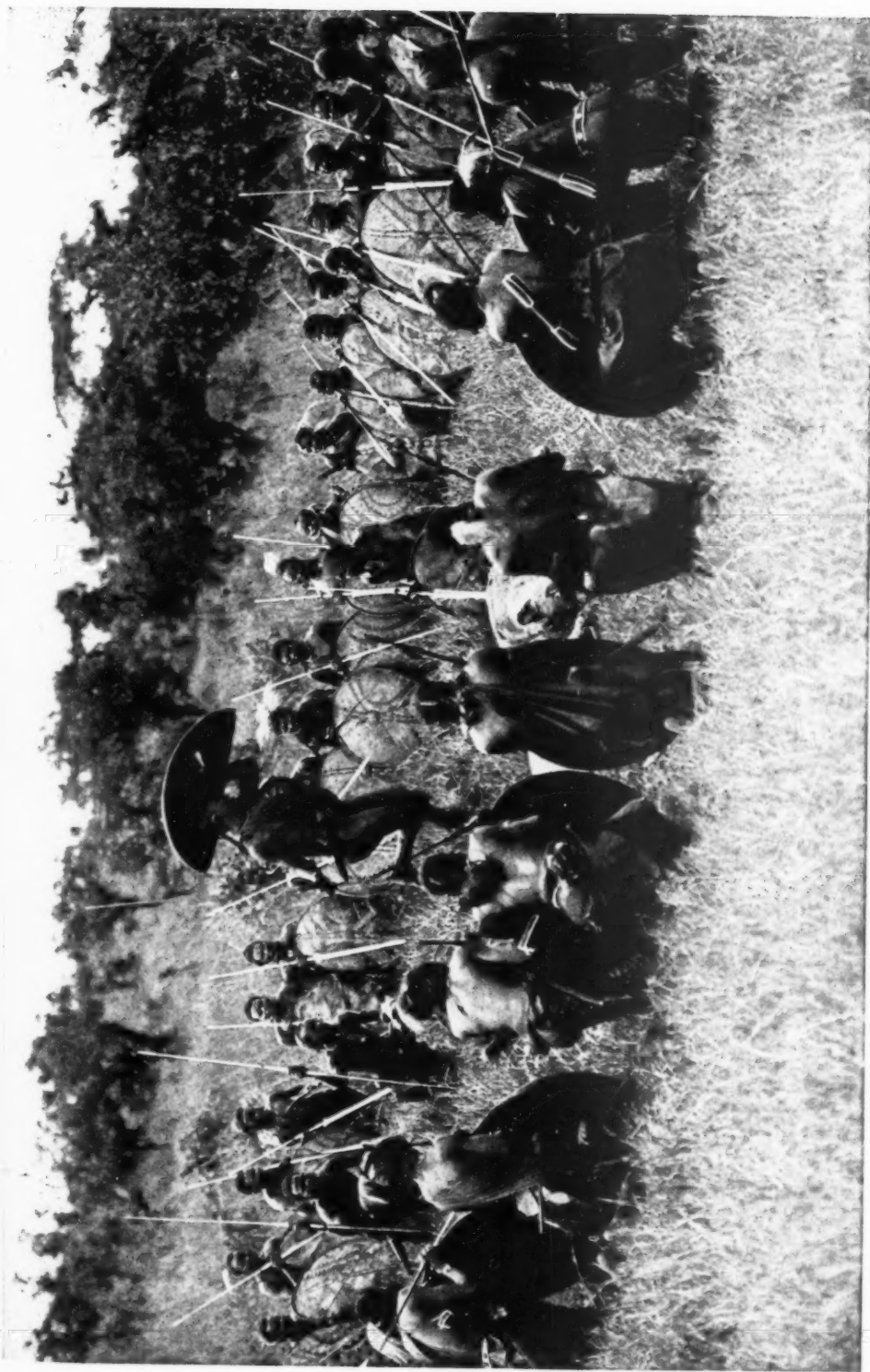
These creatures spend all day in the water and seem to be the only animals able to get on with the crocodiles. Although elephant and rhinoceros have both been known to succumb to the crocodile's voracious appetite, even the baby hippos are not molested, and crocodiles and hippopotami sleep on the sand bars together



PHOTOGRAPHING ON THE UASIN GISHU PLATEAU

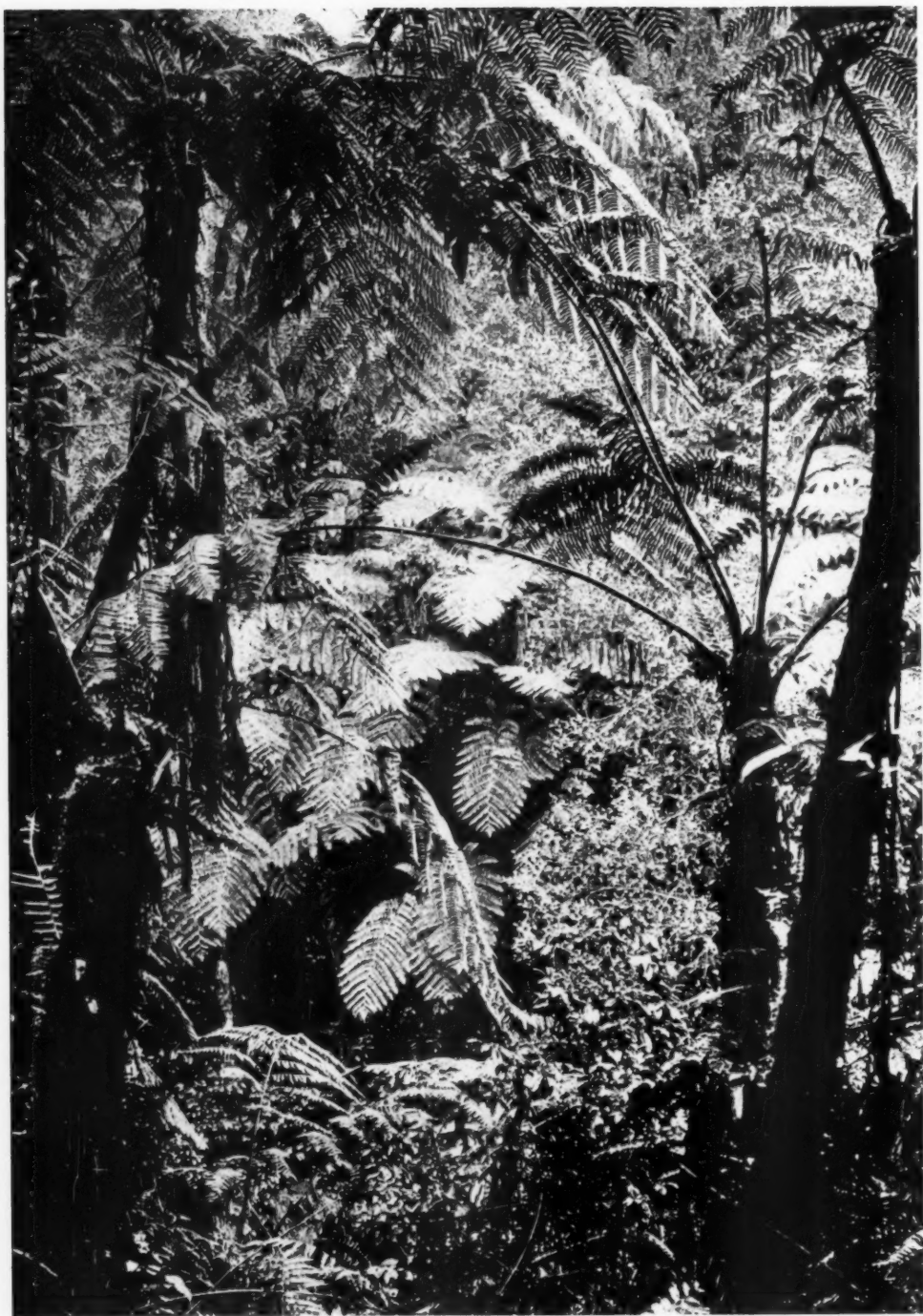
Mr. Akeley with the motion-picture camera appears at the left; beyond is a group of natives who have just speared a lion. The Uasin Gishu Plateau is a wonderful lion country, and the finest black-maned lions in British East Africa have been found there. Hunting lions on foot with spears is not as dangerous as it might appear, because the lion is bewildered by the natives closing in from all sides, and generally does not attack as he would in the case of a single individual.

Plateau is a wonderful lion country, because the lion is bewitched by the sound of spears. In the case of a single individual on foot with spears is not as dangerous as it might appear, because the lion has been rounded up and closed in, the spears fly the moment he is ready to rush. The first one hits him and he stops, having now something tangible to fight with, when instantly he is filled with spears and is immediately dead



DANCING AFTER A LION SPEARING

The natives, both during and after the event, thoroughly enjoy a lion spearing (note dead lions in the center of the circle of spearmen). This method of killing a lion is also the most humane. After the lion has been rounded up and closed in, the spears fly the moment he is ready to rush. The first one hits him and he stops, having now something tangible to fight with, when instantly he is filled with spears and is immediately dead



TREE FERNS ON MOUNT KENIA

Tree ferns are seen only at high altitudes—not below seven thousand feet—and only on the mountain slopes. They stand some thirty feet high with the undergrowth around them matted and dense. Sunlight may filter in, but even so, one full minute's exposure is necessary to get a photograph. The elephant avoids tree-fern patches, perhaps because they usually grow along the edges of steep ravines



ON THE WAY BACK TO CAMP

At Kijabi and on the Mau Plateau, buffalo were so scarce and so wary that it was impossible to obtain suitable specimens. A herd of five hundred, however, on the Tana River, was at first quite indifferent to the scent or sight of man and only after seven days of continual hunting became cautious and aggressive.

The boy is well pleased because the skull he carries is only half the weight of the customary load



YOUNG BULL ELEPHANT, UGANDA FOREST

As an elephant herd approaches in the forest, there may be an appalling din, the scuffling of the great feet among dry leaves, the crashing of brush as the great bodies plough through, trumpeting and squealing as the beasts quarrel, play and feed. The din is likely to be augmented by troops of monkeys in the trees, baboons, chimpanzees, and chattering hornbills. The hunter under screen of tall brush may approach within a few yards, but if any member of the herd hears the click of the camera or receives a whiff of tainted air, a warning shrill squeal is heard and—there is silence, followed by a charge if the hunter be discovered



CHARGING COW ELEPHANT

This member of the herd, at some unaccustomed sound, wheeled upon Mr. Akeley and stood momentarily with ears widespread and trunk thrashing wildly, then charged—a powerful onslaught of female elephant vengeance. It is not difficult to approach an elephant herd in the jungle if great caution be exercised, but it is exceedingly difficult to get away again.

[This remarkable elephant portrait was used as cover design of the February JOURNAL, 1912]



PAPYRUS AND MORNING GLORY IN UGANDA

Broad areas of swamp land are common in Uganda, often the beds of streams nearly stagnant in their flow and choked with vegetation. They are difficult to traverse, for an elephant footprint may let one down three or four feet into black ooze. Giant papyrus grows as high as fifteen feet above the water, and among its roots are quantities of fern, amaranth, gorgeous red

Disotis flowers, masses of pink or lavender colored *Pentas*, and strongly odorous mints

are almost as high as fifteen feet above the water, and among its roots are quantities of fern, amaranth, gorgeous red *Disotis* flowers, masses of pink or lavender colored *Pentas*, and strongly odorous mints



SHOULDER OF MOUNT ELGON ABOVE TIMBER LINE

Mount Elgon, more than fourteen thousand feet high, on the boundary between British East Africa and Uganda, is one of the four great mountains of Africa, and was formerly a great elephant hunting country. Elephant grass grows ten feet high on the lower slopes; above this is dense forest; and higher still are miles of clean, cool, shadowy bamboos. Above timber line are found tree groundseels, wierd lobellias, and other Alpine vegetation



THE LAND OF PROMISE FOR ELEPHANT HUNTERS

Mount Kenia spreads over an immense area, raising its snow-capped peaks more than eighteen thousand feet above the equator. The lower slopes are beautiful as a park, covered with the crops and herds of the prosperous Kikuyus. Above are perhaps five hundred thousand acres of forest country in which the Kenia elephant may live and wander and bring up his children. He has many trails that wind and weave through the twilight shades of the forest, and the only ways by which a man may penetrate his haunts are by these ancient trails



BASE OF GIANT CEDAR ON MOUNT KENIA

In these vast forests, towering trees rise, like the arches of a great cathedral, one hundred and fifty feet above, and many are more than ten feet in diameter. Mrs. Akeley stands between two of the moss and fern covered buttresses of the tree



SUNSET FROM NYERI FOOTHILLS

In Africa, during the considerable period when the old grass is being burnt off to make way for the new, the atmosphere contains much smoke; this, with the mountain mists, combines to make the sunsets behind the shoulder of Mount Elgon, as seen from a camp on the 'Nzoia River, exceedingly gorgeous night after night



ENTRANCE OF A CAVE ON MOUNT ELGON

A great stratum of solid rock, extending for miles along the south face of Mount Elgon, is honeycombed with prehistoric cave dwellings. Some of the caves are of vast proportions, extending far back into the cliff, and often containing deep lakes in their recesses. In time of siege the holders of such a cave, with granaries filled, herds of cattle, and lakes of water, could hold the place indefinitely. (Note two native wickerwork granaries at the right of the entrance.) From the mouth of this cave one can look out over twenty-five thousand square miles of Central Africa



FLAMINGOES ON LAKE HANNINGTON

The lake lies a few miles north of the equator, just under the Lalkipia Escarpment, and is the breeding place and home of thousands of rosy-hued flamingoes. In the water may be seen the remains of a submerged forest, indicating that the ground level has at some time collapsed, probably owing to volcanic action

Progress

A DRAMA OF EVOLUTION IN FIVE ACTS

By T. D. A. COCKERELL

Professor of Zoölogy, University of Colorado

Argument. — Evolutionary progress has not flowed in a single continuous stream from amoeba to man; it has branched and branched again, so that the ramifications are more numerous than the mind can follow. The most significant new branches have not arisen from the ends of the old ones, but as entirely new departures from the main trunk of the tree. Thus each great innovation, full of meaning for the future, has at first appeared to contradict the teachings of the past. The new types have usually been feeble and insignificant, never robust and dominant; and if we permit ourselves to imagine an attitude of the other creatures toward them, it must be one of contempt. In the first act, the forerunners of the vertebrates are represented by the modern Prochordates, to enable us to visualize the types, although the actual actors in the drama are of course extinct and unknown. For similar reasons, the invertebrates are represented by living species. The adoption of a new position, whereby the main nerve cord is dorsal, contradicts all invertebrate usage from the earliest times; the notochord is an entirely new development. In the course of development, the tunicate loses all the characters suggesting an approach to the vertebrate types and becomes a degenerate, sedentary sac. The *Balanoglossus* resembles a worm; but the *Amphioxus* retains its fishlike form, its well-developed nerve cord and notochord.

The vertebrate type having duly

developed in the water, the second act records the discovery of the land by some primitive amphibian, here personified by the frog. The frog celebrates his passover every spring; no wonder he sings aloud in the marshes! The ability to live on land opened up a great new field for growth and development, with the accompanying modification of the paired fins into digitate limbs, the fundamental change of structure making possible all future progress.

The vertebrate type on land developed into mighty but cold-blooded beasts, such as the giant *Diplodocus*, named after Mr. Carnegie, to be seen in the Carnegie Museum, Pittsburg, and in the American Museum. These vast dinosaurs were contemporaneous with early forms of mammals, small but warm-blooded. In time the great reptiles perished, and the mammals came to their own.

After a long course of mammalian evolution, a creature appeared, erect upon its hinder legs, with hands free to use tools. Much earlier, the birds had ceased to walk upon the anterior limbs, but had missed the possibility of human-like change through developing wings. Now comes man, relatively feeble, ugly from the standpoint of the other animals (even we regard with disgust a hairless Mexican dog), apparently a sort of developmental joke, but destined to become the topmost branch of the evolutionary tree. Conscious of his own weakness, he nevertheless puts on a bold front.

In these modern days, teachers, pro-



From a painting for the Journal by Albert Operti

LOBSTER: [Speaking for himself and his invertebrate brothers to Amphioxus and other primitive vertebrates. Beneath the waters of the ocean.] Your nerve cord dorsal! Do you know you're upside down? Clean topsy-turvy, and this somersault you say is progress! [Lobster, oyster and sea urchin laugh inordinately]

fessing to hold the learning of the past, are telling us that we "cannot change human nature"; that every wicked and vicious thing has its roots in nature, and however much it is to be deplored, it must be endured. This attitude is one of the deep fundamental causes of the present war. Let us learn indeed from the past, that significant progress

is always possible, but through narrow paths, which to our eyes, blinded by the light of custom, seem dark and dangerous. Hazarding these byways, many of us must fail, but the few who succeed will win for the human race the rich prizes of the future. This is not mere sentiment; it is the teaching of science and of universal experience.

Act I

Beneath the waters of the ocean. Seaweeds, lobsters, crabs, mollusks, etc.

Time, Late Cambrian

Enter AMPHIOXUS, LARVAL TUNICATE AND BALANOGLOSSUS

AMPHIOXUS. We are not much to look at,
but we are
All in the way of progress.
Our backs are stiffened by a notochord, and
all above
A slender nerve cord runs from fore to aft,
Prophetic of a brain. This tiny spot, this
little speck of black,
Will some day be a pair of eyes, to knowingly
survey the world,
While these gill slits, ranged on each side,
already serve
To liven us with oxygen, gleaned from the
waters flowing through them.
All in the way of progress to be vertebrates,
and in days to come
Perchance, some creature with a soul.

LOBSTER. All in the way of progress! Are
you mad?
I tell you, sirs, the progress of the past has
not been thus.
In years so many that to count by millions
is fatiguing,
In all the ages since the Cambrian dawn, and
all the unknown times before
Was never such a thing.
Your nerve cord dorsal! Do you know
You're upside down? Clean topsy-turvy,
and this somersault
You say is progress! You think the learning
of the past

Is nothing. The spirit of creation, giving
lobsters, crabs and snails,
Fine worms, starfishes and sea cucumbers:
all this
Can now be set at naught, and you, clean
upside down,
Will lead the van of progress!
[All the animals laugh inordinately.]

OYSTER. Our good crustaceous friend speaks
truly; let me ask
Where would your progress take you?
What is a vertebrate, and what this thing
You say might have a soul?
No science teaches of such things, nor any
story of the past;
A crab we know, a shrimp we know, a limpet
is concrete and real,
But this absurdity you tell of, what is it?
A recollection of a dream that dreamed of
dreams,
A twist of thought so meaningless that it is
less than nothing.
Come friends, forsake your quest and be like
us!

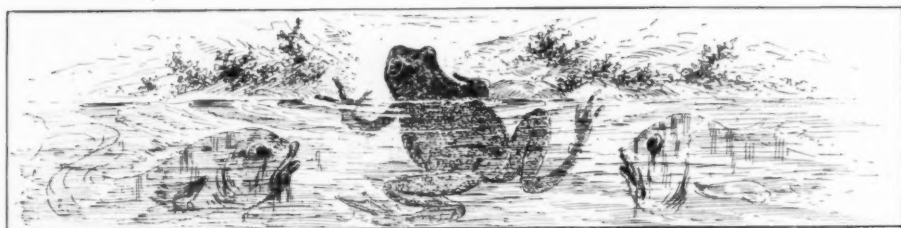
SEA URCHIN. Moreover, just consider how
you look:
Small, soft and pallid or mud-colored.
No legs, no spines, no shell, no gaudy hues
To make you seem in fashion, and in form
To mix in good society.

In truth there's nothing in your favor save
the claim
That you mean progress, and that notion's
so absurd
It serves but to condemn you.

TUNICATE. Alas! What have we come to
In this mad quest for progress?
I fear 'tis as our friends declare, we're topsy-
turvy,
And in seeking what is not, have lost what is.
For me no hope of excellence is left, no hope
of being fit to stand
With lobster, snail or maritime cucumber.
Yet I may show
My penitence in just one way, I may forego
These modern airs and change into a humble
squirting sac.

BALANOGLOSSUS. And I also must hide my
new conceits,
And simulate a worm. I pray you friends,
In charity pretend I am a worm.

AMPHIOXUS. Oh, comrades of such slender
faith,
O'ercome by tory talk,
No future lies in store for you
But one dull round to walk.
Invertebrates you cannot be,
Nor vertebrates withal,
Alone among the beasts of sea,
The laughing stock of all.
My children are the heirs of time,
My sons will rule the earth,
When vertebrates come to their own,
And human things have birth.



Act II

In the depths of a shady pool. FROGS and FISHES

FIRST SCENE

FROG. Long have I lived in deep pellucid
pools.
Life has been sweet among the tangled weeds.
Food has been cheap, since here Dame
Nature breeds
Abundantly her water worms, while schools
Of little fishes serve our utmost needs.
And yet, in midst of plenty, discontent
Arose, and urged by some strange sprite,
I must be going upward to the light,
Toward the upper air with full intent
To face the sun, and see the stars by night.

FISH. By all my barbels, 'tis a crazy thought,
What frenzy has possessed you? Do you
know
This air you talk of is not fit for use
By vertebrated beasts, gilled and soft-skinned,
Or clothed in scaly armor. The insect host,
all chitin-clad

May live on earth in air, as may the plants
that raise their fronds
O'er marsh and pool. But as for us,
The highest of created things, we need the
best environment,
The flowing waves, soft sand and mud,
Where heat and dryness, cold and wind,
Do not beset us.

FROG. Yet I must go, and do believe
'Tis in the way of progress.
Why else am I possessed of limbs,
With jointed toes and power to jump?

FISH. Jump back into the water!

FROG. No, jump on land, and see the sights
No vertebrate has seen before.
Go up and down, and eat the lowly things
Which heretofore have gone scot-free,
Except they ate each other.

Broad is the world and wide the great
expanse

Of land whereon the highest life may flourish,
Where oxygen is plenty and warm rays
Of sun above will make us grow apace.

[*Crawls out on to the land and disappears from
view.*]

SECOND SCENE

In the same pool. The FISHES discuss

FIRST FISH. Where is our frog? I heard
him talk

Of sun and air, and things above — can he
have left us?

Would he risk his life on land?

SECOND FISH. Indeed he would, and has.

Ah! foolish frog,

Thinking the pool not good enough he must
go forth

And roam upon the land. 'Twas ever thus
Since world began. Thus is creation stultified
By its creations. Making life to fit the world
whereon we live,

Toiling toward perfection, gaining a certain
goal,

Only to see its beings burst their bounds,
reject the past,

And seek at peril of their lives some other
thing.

FIRST FISH. I do believe in progress; in the
past

Seeking through wholesome change a worthy
end.

It was not ill that vertebrate was born,
Lowly and humble, upside down, despised of
all,

So came our founder to the world.

Think of it, friend! and speak not ill of
progress.

SECOND FISH. So you support the frog in
his desires

And think we all should seek the land?

FIRST FISH. Support the frog! I said not so!

All I support is progress:

Liberal at heart I love the word,

But not the actions of the frog.

All progress has an aim, and I can see

How all the past conspired to reach an end,

Through toil and conflict up and down the
world,

Age upon age, was yet one purpose clear,

To make a fish.

SECOND FISH. This fish now made, what
need of further progress?

FIRST FISH. This fish now made, creation's
task is done:

Bright scales and fins, sharp teeth, and eyes
to see

Our prey. Perfect we are, and perfect must
remain,

Scorning all change. Yet since we came

To what we are through progress, we must
love

The abstract thought of progress, and believe
'Tis still a blessed word.

SECOND FISH. Blessed for what?

FIRST FISH. Blessed for what? Oh foolish
fish!

It is not what we do, but what we think

That makes us blessed! For what we think

We are; and if for reasons of our own

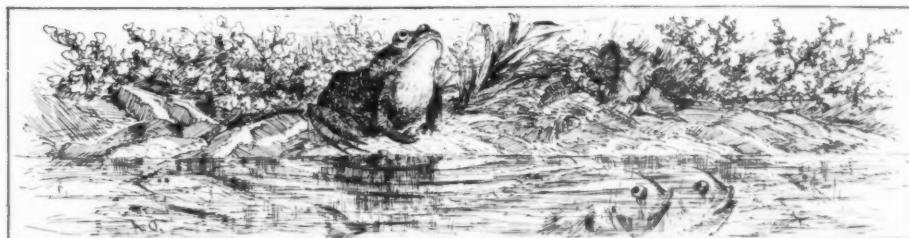
Our actions do belie our inmost thoughts,

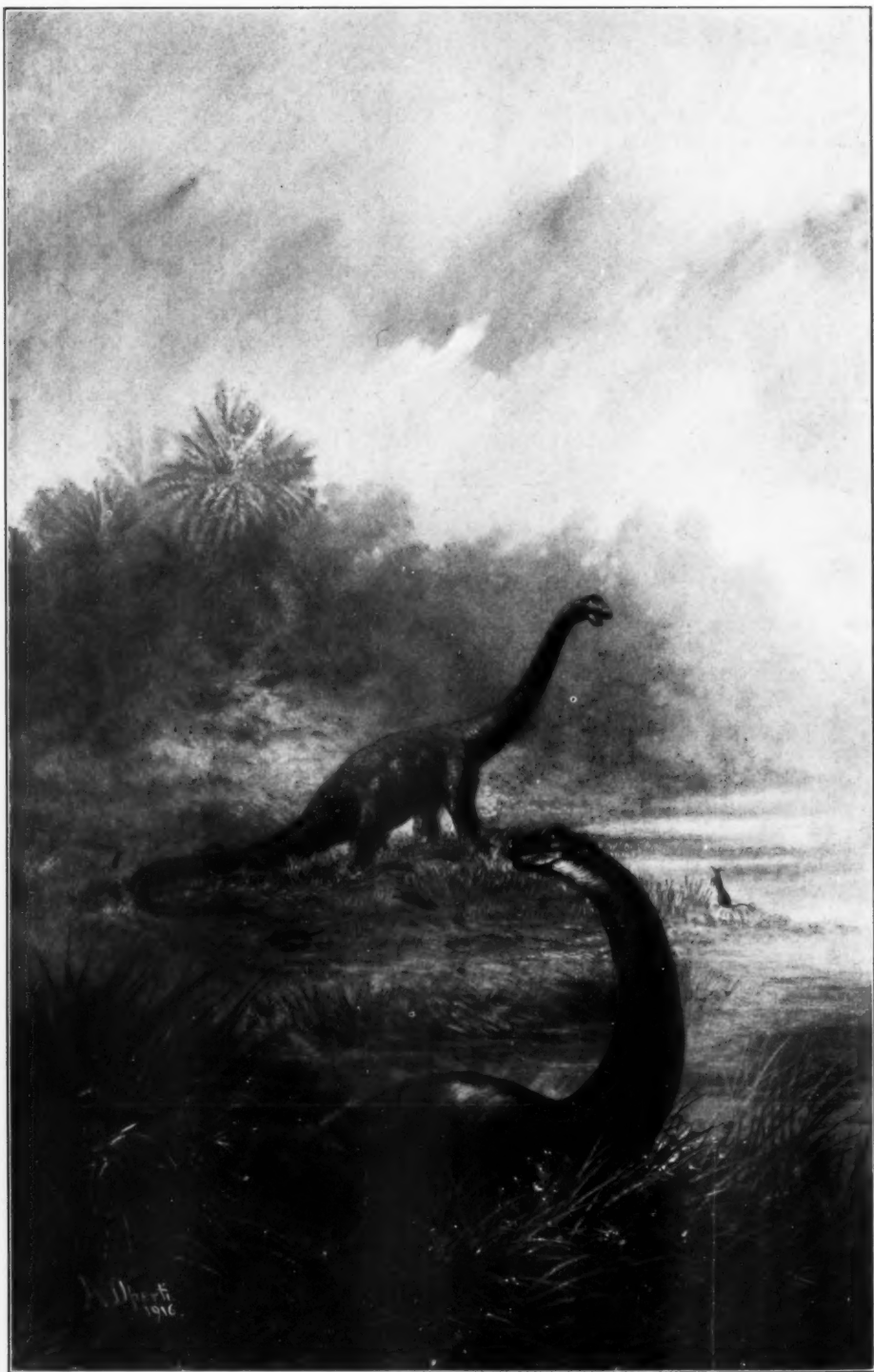
Those thoughts still make us blessed.

Thus may we keep the truth that helped the
past,

Yet do the deeds that serve us in our day.

[*The fishes swim away together.*]





*From a painting for the Journal by Albert Operti
(Diplodocus after restoration by Charles R. Knight)*

DIPLODOCUS: [Speaking to his fellow dinosaurs]. Help, help! — Nay . . . I was but dreaming, and did call for help forgetting that I am the lord of all creation . . . The thing's absurd, and yet I am obsessed with vile forebodings, connecting these small beasts, these mammals running in and out beneath our feet, with evil in the days to come

Act III

A Mesozoic Forest. DINOSAURS and PRIMITIVE MAMMALS

DIPLODOCUS. Help, help! — Nay, nay, there's naught amiss,

I was but dreaming, and did call for help
Forgetting that I was the lord of all creation.
For as I dreamed I seemed to lose my flesh
And stand stark naked in my giant bones.
And then, this horrid semblance of the thing

I was
Appeared to find a place in some great hall,
Appeared to have a label and a name —
A name I know not, dedicating my great self
To some mammalian biped!

The thing's absurd, and yet I am obsessed
With vile forebodings, connecting these small
beasts,
These mammals running in and out beneath
our feet,

With evil in the days to come.

BRONTOSAURUS. Since you have said it, I
will now confess
To like forebodings; though that dream of
yours

Looks scarcely forward in the stream of time,
But rightly judged tells rather of the past,
The recent past when you had dined too well.

DIPLODOCUS. Can I believe it? Nay I
dined too ill,
For in the marshes where I get my food
These frisky vermin have so multiplied
That food is lacking. If my dream
Has aught to do with food, it can but seem
The echo of a scanty meal.

BRONTOSAURUS. If that is so, I fear 'tis not
the first,
For look you, friend, while one of us is born,
Hatched from the egg and grown to full
maturity,
Nature can make a million such as these.

DIPLODOCUS. A million million vermin, and
therein
Abandon all the painful gains of time!
Do we not know that progress in the past,
The dorsal nerve cord and the leap on land,
The struggle through the ages, meeting each
demand
For better life, has reached its end in us?

BRONTOSAURUS. I do believe in progress;
could I see

The hope of greater or of stronger beasts,
Of vaster bulk or longer neck or better tail,
Of thicker skin or armored coat of mail,

I might be then content to die and fail,
If failing made for progress.

PRIMITIVE MAMMAL. Good masters, we have
heard your angry talk,
Wherein you set it forth that we may balk
The onward march of progress. Pray you
halt

Your condemnation. Can it be our fault
That we are small and active, living well
The lives we have; should this foretell
The downfall of your race?

BRONTOSAURUS. But look you, little beast,
your blood is warm,
Your skin is hairy, and though small you
swarm

Through glade and forest.
In all the past since Cambrian dawn,
Through all the changeful weary days,
Enduring night for hopeful morn,
Was never such a craze. You do upset
The whole great scheme of progress, and
forget
The lessons of the elder days.

PRIMITIVE MAMMAL. Great sir, we see in
you and yours
Creation's finished work. 'Tis not for us
To emulate your greatness. Yet we would
try
A line of progress all our own, and by and by
In ages yet to come evolve a man,
A being who with wingéd thought may span
The starry skies, and as in time he dies
Soar thither as a soul!

BRONT. AND DIP. [*Laughing*]. A soul! a
man! So that's your plan
For further progress!

DIPLODOCUS [*Addressing Brontosaurus*]. Our
fears were baseless, since they aim
At sky and not at earth;
Dreaming of men with wingéd thoughts
And souls to soar above!

BRONTOSAURUS. Reason failing, knowledge
spurned,
Lessons of the past unlearned,
Dreaming, seeking ghosts of dreams,
Misty thought which scarcely seems
To hold a meaning.
What is there here to fright us so,
With all our strength, and since we know
We are no seeming?

Act IV

Late Tertiary. In a forest. PRIMITIVE MAN and various animals

HYÆNA. [*Laughing.*] Oh! have you seen,
have you but seen the thing they call a
man?

His body's out of shape and placed on end,
Erect upon his hinder legs, his hair is gone,
And hideously naked stalks he through the
glade.

Creation must be crazy to have made
So foul a beast!

JACKAL. The other morn I saw some human
cubs

More helpless than their sires, mere blobs of
flesh,

Squirming and squealing, while with mute
distress

Their mothers sought to mend their evil fate.
Feeble in youth and age, in sooth the date
Of man's extinction must be near at hand.

HYÆNA. Full well they know it, for they
can but ken

They're nature's greatest joke, and making
men

She sought but to amuse the gods.

JACKAL. Forsooth I know the cause of my
surprise

The day when I heard laughter from the skies.

HYÆNA. I say they know it, and to prove
my word

Let me but tell you of the news I heard.

They are ashamed of their naked state,
And some, more wise than others, have of late
Sought leaves and vines to hide their horrid
flesh.

Thus covered like the case-worms on the trees,
They seek the hardness of their fate to ease,
The very act confessing their distress.

JACKAL. Here comes a man, we'll call him
to account;

Let him excuse himself as best he may.

MAN. Kind friends, have patience, for I can
Do things you cannot, since I am a man.

Erect upon my hinder legs I lose
In speed and looks perchance, but I may use
My hands in godlike manner to create.
My hands thus freed, the brain will grow,
Guiding the tool, till I shall know
To weave the pattern of my human fate.

HYÆNA. To do the work of gods is then your
dream.

Oh friends! how can a creature thus blas-
pheme?

BIRD. To walk on one's hind legs is quite a
plan:

To that extent I will defend the man.

The front legs freed may serve a useful end
When, feather-decked, as wings they upward
send

Our bodies, soaring far above the earth,
Where in the air we carol forth our mirth.

MAN. Sublime it is to fly, but better yet
To conquer nature with the mind, and so to
get

Her forces held and altered to our use.

The working hand and thinking head unite,
Till weakness is converted into might,
And praise succeeds abuse.

Thus may we hold the earth and even try
Though featherless and handed, yet to fly.

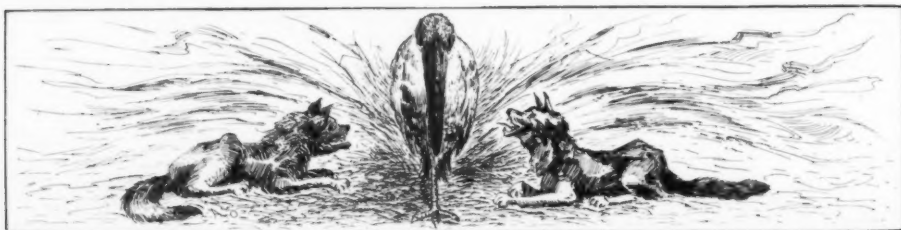
BIRD. The man's insane, what better proof
Than his mad words? Let's hold aloof,
And leave him to his wretched fate,
Striving alone to reach the golden gate
Of heaven, and in godlike ways
Command the earth and hold the very rays
Of sun above to serve his foolish ends.

[*The animals draw aloof.*]

MAN. [*To himself.*] They rightly call me
weak, they rightly say

I am ashamed.

This body would I hide, and in this mind
Stir doubt and fear, my very soul doth quake
With strange forebodings of a new-born sense,



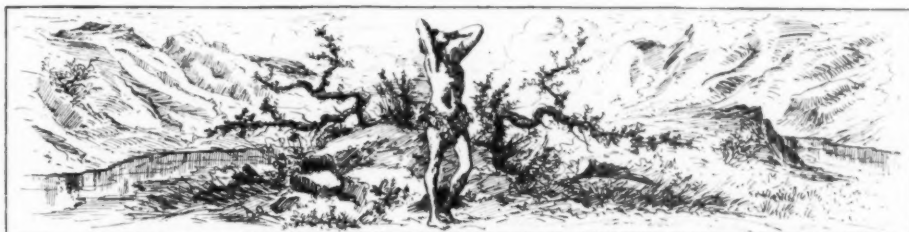
The sense of sin. How can I make
My peace with earth below or heaven above?
By mental strife or fruits of conscious love
Atone for my mistake?

* * * * *

The die is cast, the choice is past,
And choosing once, I stand condemned
To ever choose again. So let it be, since I
am free,
My fate lies in my hands,
Frail, imperfect, fasting ever,
Stumbling on till death may sever

Chains that bind the soul:
May heaven judge me by my meaning,
Striving, searching, ever gleaning
Parts of nature's whole.

ANIMALS. [*Regarding MAN from distance.*]
The man strides forth, his eyes ablaze,
He means to conquer, win the praise
Of earth and sky.
Full strange it is he has no qualms,
He shows no dread, or vague alarms,
No fear to die!



Act V

The Present Day. [*Enter MARS, PLEBS, PAX, PRÆCEPTOR.*]

MARS. Hear the sound of marching soldiers,
Cannon thunder on the height,
Clash of arms and cry of battle,
Lurid camp-fires in the night.
Onward men, and try your valor,
Now or never do your best,
Forward now and slay the foeman,
Mars will put you to the test.

PAX. Though the din of battle ringeth
Loud and fierce on either hand.
Time, the Lord's good servant bringeth
Peace throughout the land.
Shall it be the peace of living,
Herald of a better day,
Former foes in friendship giving
Each what e'er he may?
Else the peace of dire destruction,
Death, the victor now supreme,
Lost the hope of reconstruction,
Social progress but a dream.
Choose, O Plebs, while yet you may,
The falling night drives out the day.

PLEBS. No choice is mine, this awful fate
Is born upon the wings of time,
The angel host at Heaven's gate
Are partners in the crime.

PRÆCEPTOR. Good pupil, Plebs, I told it so
To thee in younger, brighter days:
In subtle ways I made thee know

A path of logic through the maze
Of thought and action, hate and fear:
I taught, and teaching, bade thee hear.

PAX. Taught him to think the devil's hand
Must ever rule throughout the land!

PRÆCEPTOR. Kind peace, I bid him love
thy name,
To hate the devil and his kind,
To feel the horror and the shame
That burdens all mankind.
I told him this, but bid him know
The ages could not change,
The future from the past must flow.
He must not think it strange
If Mars in might should stalk abroad,
And Pax lay vanquished by the sword.
So must he stand to guard his own,
Be guided by the past alone.

PAX. Be guided by the past, indeed!
Then know the past, its teachings clear,
To him who hath the head to read
And heart to banish fear.
The teaching of the past is this,
That day contrasts with night,
That custom's slaves must ever miss
The path upon the height.
The child condemned on every side
Grows up to be the future's bride.



Photograph by courtesy Charles Scribner's Sons

DR. VITAL BRAZIL AND COLONEL ROOSEVELT

In South America Dr. Brazil is successfully employing as a treatment for snake bite, various antivenomous serums of his own manufacture. He has recognized the importance of administering a specific serum made through the agency of the particular poison it is intended to combat.

The photograph, taken at Sao Paulo, Brazil, shows Colonel Roosevelt and Dr. Brazil (at the extreme left) witnessing a notoriously cannibalistic snake, the mussurana, swallow a fer-de-lance

The Treatment of Snake Bite

By CLARENCE R. HALTER

TOGETHER with the general advance in the discovery and preparation of specific antitoxins employed in cases of infectious diseases, there has appeared a very reliable serum, or antitoxin, for the treatment of snake bite. This antivenomous serum as it is called, is prepared in much the same way as are the other antitoxins used in the various hospitals throughout the country.

A large and powerful horse is generally selected and inoculated at certain intervals with gradually increasing amounts of snake poison. At the beginning of the treatment the doses are so small as to produce no very marked physical manifestations, but as the animal becomes immune to the action of the venom, the doses are increased until there appears a time when the system is so fortified against this poison that it produces no ill effects whatever upon the horse. At this stage blood is drawn and allowed to congeal, and the serum which separates from the congealed mass is collected and put up in hermetically sealed tubes or bottles, ready for use. In a dry state this antivenomous serum keeps indefinitely, but in a fluid form it seldom keeps its antitoxic properties longer than six months. After such a lapse of time it is advisable to discard it, and procure a fresh stock.

The dissimilarities in the action of virus of different snakes necessitate the employment of a specific serum corresponding to each virus, and indeed prepared through the use of the particular poison it is intended to combat. Dr. Vital Brazil, world famous as a toxicologist, has prepared two specific antivenomous serums, anti-crotaline serum for use in instances of rattlesnake bite, and anti-bothropine serum administered in cases of bites of the *Bothrops* or *Lachesis* snakes, comprising the fer-de-lance, the bushmaster (the largest poisonous snake of the Western Hemisphere) and the other pit vipers of this genus. The antivenin produced by Dr. Albert Calmette of the Pasteur Institute in Lille, France, is quite effective against the violent action of the elapine and crotaline snake poisons, and is produced through the agency of the venom taken from the cobras

and the vipers. It may be remarked in this connection that the venom of the cobras and their allies is chiefly neurotoxic in its properties, affecting the nervous system to a very marked degree, while the poison of the crotaline snakes is mainly hæmorrhagic in its action, violently attacking the blood system while having comparatively little effect upon the nerves. Therefore we must readily understand the value of employing a specific antivenin which is prepared to counteract a neurotoxic or a hæmorrhagic venom as the circumstances may dictate.

In the general treatment of snake bite other measures besides the administration of the serum must be undertaken, and in order to understand more fully just how these are carried out let us look into the case of Mr. John Toomey, one of the keepers in the reptile house at the New York Zoölogical Park.

On the morning of January 27, 1916, Mr. Toomey was cleaning a cage in which was kept a powerful example of *Crotalus atrox*, the Texas rattlesnake. Without the slightest warning, as quick as a flash, this five-and-a-half-foot reptile, weighing over ten pounds, lunged its head at the object of its provocation and buried its fangs in Mr. Toomey's hand. Shouting to his fellow workers to come to his aid and to summon a physician, Mr. Toomey closed the door of the cage. Instantly the head keeper, Mr. Charles Snyder, proceeded to suck the wounds. This quick move on the part of Mr. Snyder had much to do with the saving of the victim's life, as he thus relieved the hand of a considerable amount of venom. Almost immediately following, two rubber ligatures were applied, one at the wrist and the other on the upper arm, in an effort to prevent the poisoned blood from gaining the circulation of the body. In some instances it is best to scarify the two fang punctures in order to accelerate the flow of poisoned blood and expose a larger surface to the action of the poison oxidizing fluid used in bathing the wound. In other circumstances the physicians may find it inadvisable to enlarge the two fang punctures with a razor or scalpel from fear that gangrene might otherwise set in. While a private practitioner of the park was on his way to the

reptile house the wound was massaged and repeatedly bathed with a permanganate solution, which is made up by dissolving potassium permanganate crystals in water until a deep wine color is produced.



By courtesy Sturgis and Wallon Company

A Hindu snake-charmer's outfit.—The rearing snakes are specimens of the cobra de capello (*Naja tripudians*), or spectacled cobra, whose poison attacks the nerve centers of a victim. This most sensational of poisonous snakes swarms over India, causing fearful loss of human life. The "hood" discloses a weird marking not unlike a pair of spectacles.

The reptile crawling from the basket is the tic polonga, or chain viper (*Vipera russelli*), a common snake in India, whose poison attacks the blood of the victim, producing internal hemorrhage.

About one and a half hours later the physician administered the serum produced by Calmette. It was injected hypodermically not near or into the wounds, but under the

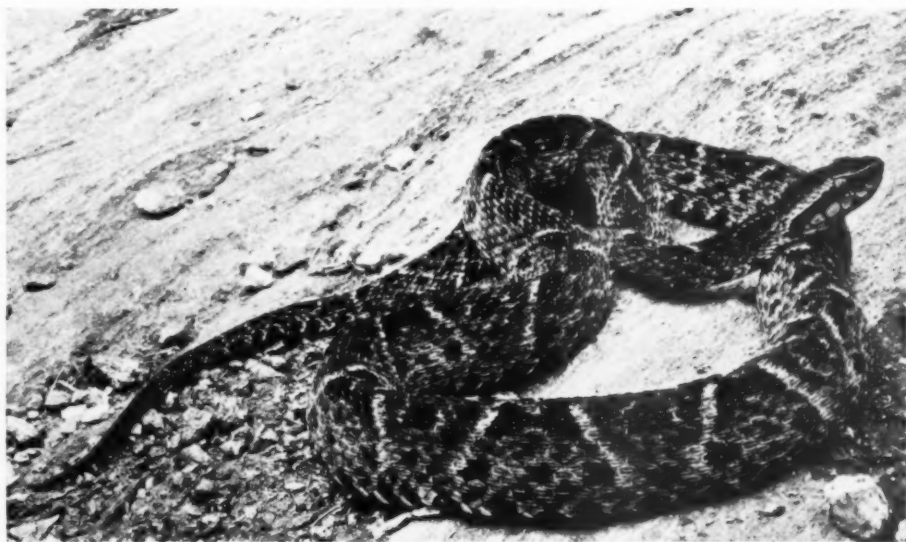
skin of the abdomen, where it gained ready access to the general circulation and was carried throughout the system. In a few minutes the ligatures were removed and then for the first time marked local swelling and discoloration—the characteristic effects of crotaline poisoning—set in. Unfortunately the serum which was in crystalline form, took so very long in dissolving in the cold water (and warm water must not be used as it coagulates the serum) that matters began to take a serious turn. Mr. Toomey was taken with violent chills, followed by nausea and profuse perspiration. Immediately after the injection of the first serum the physician and Mr. Raymond L. Ditmars, curator of reptiles in the New York Zoölogical Park, began fluidifying the second tube of Calmette's serum which they used on Mr. Toomey at one o'clock. At intervals of twenty minutes small doses of brandy were given as a form of stimulant. It is well to emphasize the fact that whiskey never did and never will cure snake bite, and taken in large quantities it not only produces no beneficial effects but also is actually deleterious to the recovery of the patient. Those people who claim to have been "cured" by whiskey, recovered not because of it, but in spite of it. At four o'clock in the afternoon Mr. Toomey was removed to the German Hospital and on the following morning was almost in a state of coma. By this time the arm had become alarmingly swollen, being over twenty inches in circumference, while the pectoral muscles were likewise swollen. Also discoloration due to the internal hæmorrhage had begun.

At this point Mr. Ditmars attempted to locate Dr. Brazil, Director of the Instituto Serumtherapico de Butantan in Sao Paulo, Brazil, who chanced to be in this city and about to sail for South America. Not until late in the afternoon of this second day could he be located, then his antidote, the anti-crotaline serum, was administered. Mr. Toomey's condition changed at once and he began to improve rapidly. So effective was the serum and so rapid the decrease in the swelling that it was unnecessary to make the customary drainage cuts, important heretofore in cases of snake bite. By the thirtieth, three days after the accident, the swelling had decreased one half. In the afternoon of that day a consultation was held by Dr. Brazil, a representative of the staff of the German



By courtesy New York Zoological Society

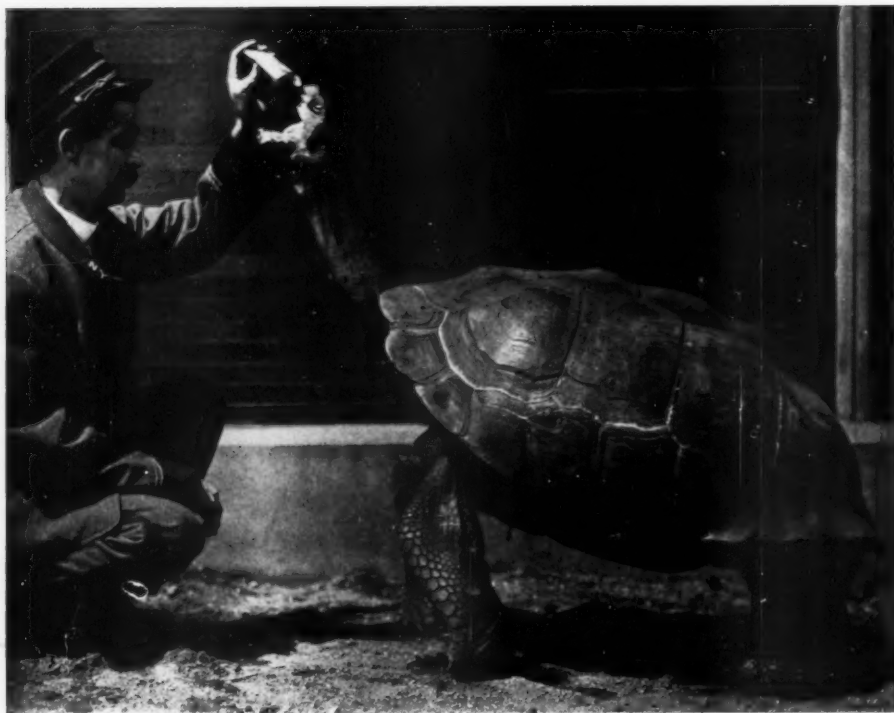
The Texas rattlesnake (*Crotalus atrox*), sometimes seven feet in length, is common in the sub-arid regions of the American Southwest. It was a specimen of this snake in captivity at the New York Zoological Park that recently gave in New York City an opportunity of judging of the powerful effect of crotonine poison and the counteraction of this effect through the use of antivenomous serum



By courtesy New York Zoological Society

The fer-de-lance, or lance-headed viper (*Lachesis lanceolatus*) is a greatly feared snake found in southern Mexico, tropical South America and the West Indian Islands, where, like the other poisonous snakes of the region, it causes a considerable loss of life. Its poison is used by Dr. Vital Brazil in making a specific antitoxic serum

The fer-de-lance is a near relative of the deadly bushmaster (*Lachesis mutus*) of Central and South America. The bushmaster has the distinction of being the largest poisonous snake of the New World. It is said to attain at times a length of twelve feet



By courtesy New York Zoological Society

Mr. John Toomey, of the New York Zoological Park, who, owing to the use of antivenomous serum, has recently recovered from the bite of a rattlesnake, *Crotalus atroz*. Mr. Toomey has charge of a section of the reptile house at the park

Hospital, and Dr. Gustav Langman, an authority on snake poison, besides Mr. Ditmars and Dr. William T. Hornaday, Director of the New York Zoological Park, to witness the dressing of the wound by the attending physician and also to pass on the measures to follow. After thoroughly examining the bitten limb Dr. Brazil concluded that Mr. Toomey was on the road to speedy recovery and that an injection of another tube of serum was unnecessary. Speaking of the case later, Mr. Ditmars said, "I attribute the marvelous recovery to this truly specific serum which marks the crowning point of years of untiring research on the part of Dr. Brazil." It was noted at the time how remarkable it was that from the bite of so large a snake as this Texas rattlesnake, no neurotoxic effects whatever were in evidence. This absence was the direct result of the early administration of Dr. Calmette's serum which is more valuable in combating the bites of elapine snakes, whose virus attacks the nervous system, than it is for counteracting the effects of rattlesnake poison.

Two weeks after the accident Mr. Toomey left the hospital. It is expected that he will be wholly recovered in a short time and that he will suffer no recurrence of symptoms in the future.

In the United States, where records of snake bite are of rare occurrence, one hears very little of the results achieved by use of the various reliable antivenomous serums. In countries infested with deadly snakes, however, and where the natives are superstitious and reverence the serpent, and also walk about barelegged, thus exposing themselves to the lurking danger, deaths resulting from snake bite are a matter of daily occurrence. In India alone, over twenty thousand deaths a year are attributed to the various poisonous snakes, especially the cobras, which are diabolical in their temper, bold and aggressive, and at times actually inhabit the native dwelling places. It is from these countries that we hear of the remarkable efficacy of these antitoxins, which will, no doubt, go down in history as one of the great medical gifts to mankind.

LANGUAGE AS AN INDEX TO ANCIENT KINSHIPS

By Pliny E. Goddard

NEW things and new arrangements and classifications of things require new names. The study of mankind in an objective way is comparatively new and in America has been called anthropology. In Europe however this name is generally restricted to the comparative study of man's body, a science distinguished in America as physical anthropology. If the various aspects of humanity which are physical or biological, such as physical form and inherited instincts be segregated, there remain those habits and activities of mankind which are acquired and transmitted in other than direct biological ways. These constitute the culture of any group or race, and the study of this culture has been termed ethnology. Now the transmission of culture from generation to generation, or from one locality to another, takes place through imitation by the individual of the acts of others, either consciously or automatically. By this means individuals are assimilated into the race or group and a fairly uniform culture is established over considerable areas, and maintained often for many generations with little change. It is this matter of the transmission and spread of culture that particularly interests ethnologists today. Working with peoples that have no written history of the past, attempts are being made to reconstruct the preceding cultural groups and former cultural contacts from a study of cultural similarities.

Although within the social group, culture passes from generation to generation by the acculturing of the succeeding generation to the preceding one, this process is not a uniformly continuous one, but several stages exist through which each normal individual passes. One of these stages is confined to the individuals under adolescence but old enough to mingle freely with other children. The normal child becomes thoroughly acculturated to this group before reaching the age when he tends to pass into the next higher group, so that he speaks the language of his fellows perfectly and has mastered the technique required for various games and other activities. As the individual matures he moves from one stage to another, acquiring in each the culture proper to that stage,

until in late middle life he loses the capacity for further acquisition or adaptation. Changes in the culture of any group are usually attributable to incomplete acculturation resulting in retrogression; to the initiative of individuals, sometimes for the better and sometimes for the worse; and to the influence of neighboring social groups possessing a somewhat different culture.

Now the culture of a people as a whole, regardless of its stratification, due to various classes based on age, sex and wealth, is a very complex thing. It may be analyzed into several large groups of activities, such as language, including all means of communication; the practical arts, relating to the securing of the necessities of life; the æsthetic arts, never entirely wanting and often highly developed; social organization, by means of which the people are controlled and grouped into families and clans; and religious activities.

It is a matter of observation that these several divisions of culture vary in stability or permanence. Upon *a priori* grounds we should expect the practical arts to be more directly dependent upon physical environment than is language or religion, and such seems to be the case. When a tribe which depends upon wild animals or uncultivated plants for its supply of food, changes its habitat, it is forced to adjust its methods of securing food almost immediately. Even if the animals upon which it has been accustomed to live are to be found in the new home of the tribe, the methods necessary to approach and secure them are almost sure to be different. The necessity for daily food brooks no delay in this adjustment.

The æsthetic arts and religion, while fairly independent, at least in so far as they can and do persist without great change during or after a migration, are especially susceptible to the influence of neighboring social groups. Decorated objects pass from tribe to tribe and are often treasured because of their remote origin and unique character. In this manner designs and styles of art may spread from tribe to tribe. Missionary zeal seems not to be confined to any race or type of religion. The attitude of our Indian tribes toward religion is a queer combination

of a conservatism which treasures and conceals old beliefs and customs, and an eagerness for something new and more powerful.

Judging from the facts as we find them in North America, language has been particularly conservative. Large groups which have been broken up and separated from one cause or another, have become so diversified in all other phases of culture than language, that language itself affords the only means of establishing the former existence of the original group. There are some interesting instances of this conservatism of language.

The Micmac of Nova Scotia and the Blackfoot of Montana and Alberta are separated by two thousand miles of distance. The former is a typical eastern tribe with the culture of the Woodland peoples. They make great use of birchbark, live upon fish and game, are grouped into family hunting bands, and at the present time have no elaborate religious ceremonials. The Blackfoot, fifty years ago, were a buffalo hunting tribe living in skin tents, with the social and religious organization of their Plains neighbors. It is doubtful if anyone would have thought that the Micmac and the Blackfoot were to be classed together in any respect, were it not that their languages prove to be definitely akin. The Blackfoot, separated from the Micmac either by a migration or by the intrusion of the Siouan peoples between them, have been completely acculturated to their neighbors except in the one particular of language.

The Athapascan-speaking tribes offer still better examples of this kind. We have a large area in the Far North, the valleys of the Mackenzie and the Yukon, sparsely settled by the Dogribs, Chipewyan, Kutchin, and other groups. The culture here is extremely simple. Coming southward east of the Rocky Mountains we find the Sarsi in Alberta, numbering about two hundred, so like the Blackfoot in culture as to be practically indistinguishable. They all speak an Athapascan dialect, very little influenced in structure or vocabulary by their Algonkin neighbors, although very many of the Sarsi speak Blackfoot also.

It will be seen that while in other respects a people adjust themselves fairly well to new surroundings, language contrives to persist. The Athapascan group of closely related languages is found in the culture areas of the Mackenzie, the Plateaus, the Plains, the South-

west and California. In no one of these widely separated divisions do we find any indication of former unity or the survival of a common culture, except that the languages, on even superficial examination, show that they are all derived from the same source, and that therefore the tribes speaking them must have been at some time in close social contact.

On the other hand, particularly in California and on the Northwest Coast of North America, we find two fairly uniform cultures rather distinct from each other and from all others, yet each of these cultures includes a large number of distinct languages. Here the leveling influences of social contacts and a common environment have wrought uniformity except in language.

These are the facts. What, we may ask, are the causes of so great conservatism in language? One of these causes may be that language is acquired by the child in the home before it is capable of walking about and seeking any society beyond that of the immediate family. The vocabulary of the child is limited and is added to throughout life, but the form of the language becomes fixed very early. The ordinary child acquires and is able to pronounce clearly the sounds of its own language by the time it is eight or nine years old. Soon after that age, at fourteen or fifteen, it becomes incapable of hearing and reproducing the unfamiliar sounds of a foreign language perfectly. The process of acquiring a language is so difficult for an adult that it is attempted only under exceptional circumstances. There may be something too in the fact that speech, having been once acquired, often becomes very largely an unconscious reflex process. A highly organized language of the usual American type is so thoroughly a unit that it is generally not possible to mix two unrelated languages. The old must be discarded in its entirety and the new language adopted in its place. The feeling of the identity of the social group is however too closely bound up with language to allow such changes.

That languages in North America have given way and been discarded by the people who formerly spoke them for the languages of their neighbors, may have happened repeatedly; but since language is the last element of culture to disappear, when it does go there is nothing left, and all evidence of former differences and likenesses is lost.

Are Our Birds Decreasing or Increasing

By HENRY OLDYS

ONE of the features of a meeting of the American Ornithologist's Union, held not long ago in Washington, was a discussion of the present relative abundance or scarcity of insectivorous birds in the United States. The conclusion reached, to which all the speakers assented, was that the insectivorous birds are now much more numerous than they were in the days of the original settlers. This verdict was based both on theoretical condition and actual observation. In 1898, Dr. W. T. Hornaday of the New York Zoölogical Park, on the strength of reports secured from many naturalists, estimated an average decrease of forty-six per cent in the birds of thirty states and territories in the preceding fifteen years. In 1904 Mr. Edward Howe Forbush, under direction of the Massachusetts State Board of Agriculture, prepared a similar report concerning the birds of Massachusetts, based on opinions obtained from more than two hundred persons. The conclusion he reached was that "the smaller birds in general have not decreased greatly in Massachusetts as a whole in recent years, except in and near the centers of population." The discrepancy among these various conclusions is palpable, even after making due allowance for the fact that Dr. Hornaday's summing up includes game birds which, as is well known, have undergone a marked decrease.

Aside from the annual statement of the condition of game animals and game birds, based on reports of sportsmen, which was issued by the United States Department of Agriculture for several years, I am not aware of any other attempts to ascertain the extent of numerical changes in our avifauna. The Department of Agriculture has however, put into operation a scheme for securing a count of nesting birds in limited areas throughout the country, by which means a more or less reliable basis may be obtained for comparison with similar counts on the same areas periodically. Incidentally it might be mentioned that the government of Germany a few weeks before the beginning of the great war, inaugurated a like count of its birds.

Somewhat on the same order was a census,

made under the direction of Dr. S. A. Forbes of the University of Illinois a few years ago, when several assistants made trips across the State, noting all the birds in their paths, while others made similar observations in selected circular areas. Information of this kind, as Dr. Forbes points out, cannot be taken as a proportional basis on which to estimate the total number of birds in a state, but must be regarded merely as a census of the areas under observation, a limitation particularly applicable to Illinois with its exceedingly varied topography, but holding true of practically every other state in the Union.

While all such efforts to determine the relative abundance or scarcity of birds, whether by actual count or by general observation, have a definite value, yet that value must not be overestimated, a caution that would, I doubt not, be seconded by those who have been instrumental in securing such information. Those schemes that involve a count of the birds cover but an insignificant part of the region under investigation, while in the others a very great degree of uncertainty is injected by the personal element. The latter difficulty is well set forth by Mr. Forbush in his report. "A conclusion one way or the other," he says, "cannot safely be formed by any individual unaided, except in regard to a limited territory with which he has been familiar for a series of years. Such a conclusion, when formed, is merely an opinion, and the personal equation inevitably comes in to bias it. Some people are naturally optimistic, and their reports show it; or they have recently begun to study birds and see more of them now than in former years. Others are pessimistic, or have become imbued with the popular belief that our birds are being rapidly exterminated. Some are elderly people, who do not, perhaps, hear or see so clearly as in their youth, and are not so much afield, and do not notice so many birds as in their younger days. Some reports come from closely populated regions, where many causes operate to destroy or drive out the birds; others come from more sparsely peopled regions, where the birds and their natural enemies are not so much interfered with. These personal or environmental

differences tend to produce contradictory reports."

Still less can the figures thus secured be used as sound statistics when no attempt is made to separate birds by groups according to the different influences at work upon them. Thus, to class the wild turkey, which early colonists in New England were accustomed to shoot from the doors of their dwellings, but which is now practically confined to a few favored localities in the southern half of the United States, with the English sparrow, whose phenomenal increase is within the knowledge of all, and to report that the wild turkey and English sparrow on the average have neither increased nor decreased, would palpably be an unsatisfactory conclusion. Yet while not so striking, other groupings are equally inconclusive. Birds that habitually nest in swamps must decrease as swamps are drained unless they alter their habits to conform to the changed conditions, which is not evident; while birds that build about homesteads are likely to increase as homesteads multiply. It will readily be understood that to average these two distinct classes will produce results that can have little, if any, scientific value.

To attain a high degree of accuracy all investigations of relative numbers of birds should consider each species separately and should give due weight to all factors that may enter into the problem; even then allowance must be made for error — human bias, incomplete returns and overlooked factors. The complexity of the inquiry may be illustrated by one or two examples. Bewick's wren is a bird that nests freely around the homestead; hence it would seem that increasing settlement of the country should cause it to increase. But the same influence tends to increase the aggressive house wren, which is inimical to Bewick's wren and reduces its numbers by breaking up its nests and driving it away from the homestead. Again, the destruction of hawks and owls would appear to be of direct benefit to the crow blackbird by reducing its enemies; but hawks and owls keep down crows, which rob the nests of blackbirds and of course would do so with greater frequency in the growing decrease of hawks and owls. So, too, the spread of the gospel of bird protection, with its repressive influence on destruction of birds by boys, on the shooting of the larger non-game birds by men for sport,

on the collecting of birds for the cage or for the millinery market, and the success of this doctrine in its advocacy of providing food, shelter and nesting places for birds, ought, one might think, to cause a general increase of all non-game birds. But the changed conditions thus brought about are also beneficial to such birds as jays, crow blackbirds and others of the larger birds that have the habit of feeding on the eggs and young of the smaller; other things being equal, these tend to increase disproportionately and in a growing ratio. (This rule however is subject to special exceptions.) It has been found also that the substitution of the camera for the gun may work for actual net decrease of birds in regions occupied by foxes, which are reported to follow the scent of the nature photographer and clean out occupants of the nests he photographs. A like habit of foxes in England has caused keepers on game preserves to be chary of visiting nests of pheasants and partridges.

These and many more agencies of increase or decrease must be given due weight in any adequate investigation. Certain indications must also be noted as fairly reliable. Thus, the mocking bird in the East and the cardinal in the Middle West appear to be extending their ranges northward. From this we may tentatively conclude that these species are increasing, especially since, through the abolition of the wide practice of trapping them for cage and aviary, an increase might naturally be expected. The growing restriction of the shooting of robins in the South should cause an increase of this species; this expectation is apparently confirmed by the much greater abundance of nesting and wintering robins near Washington City, and doubtless elsewhere on the borders of their range. So, on the other hand, the shrinkage in the natural range of the bobwhite and the prairie chicken points to a decrease of these much-hunted game birds.

It would seem desirable that inquiries into relative scarcity or abundance of birds, should consider them species by species, that trustworthy facts may be deduced. An investigation of this kind, which might well be undertaken by the United States Department of Agriculture or the National Association of Audubon Societies, would supply information that might serve as a satisfactory basis for rational and intelligent measures for the protection and proper utilization of birds.

The Palisades Interstate Park¹

NOTES FROM AN ADDRESS BY THE HONORABLE GEORGE W. PERKINS,
BEFORE THE MEMBERS OF THE AMERICAN SCENIC AND HISTORIC PRES-
ERVATION SOCIETY AND THE AMERICAN MUSEUM OF NATURAL HISTORY

LOOKING across the Hudson from Grant's Tomb the appearance of the Palisades is that of an almost perpendicular escarpment, wooded and beautiful. There is perhaps no other river, the banks of which, so near one of the world's great cities, have been permitted to retain their natural grandeur.

Fifteen years ago, because of the destruction which had been going on all through the lower end of the Palisades from a point south of Nyack to Grant's Tomb, twelve and a half miles, a bill was introduced at Albany creating what is known as The Palisades Interstate Park Commission. Exactly the same bill was introduced in New Jersey, nine-tenths of the Palisades lying within the boundaries of this State. Five commissioners were appointed by each governor and an arrangement was made by which the two groups of five from the two states were to work together as one body of ten men, but legally as two separate bodies.

The destruction of the Palisades, at three main points, was fast making inroads into the cliffs for the purpose of getting out the flat rock for road building. The rock from these quarries was so desirable that it was likely to be a question of a short time only when twenty or thirty quarries would be strewn over the cliffs.

When the bill was passed in Albany, the legislature gave \$10,000 for expenses, the commission was given general instructions, and went to work. Most of the men on this commission were business men or lawyers; there were no politicians. With the \$10,000

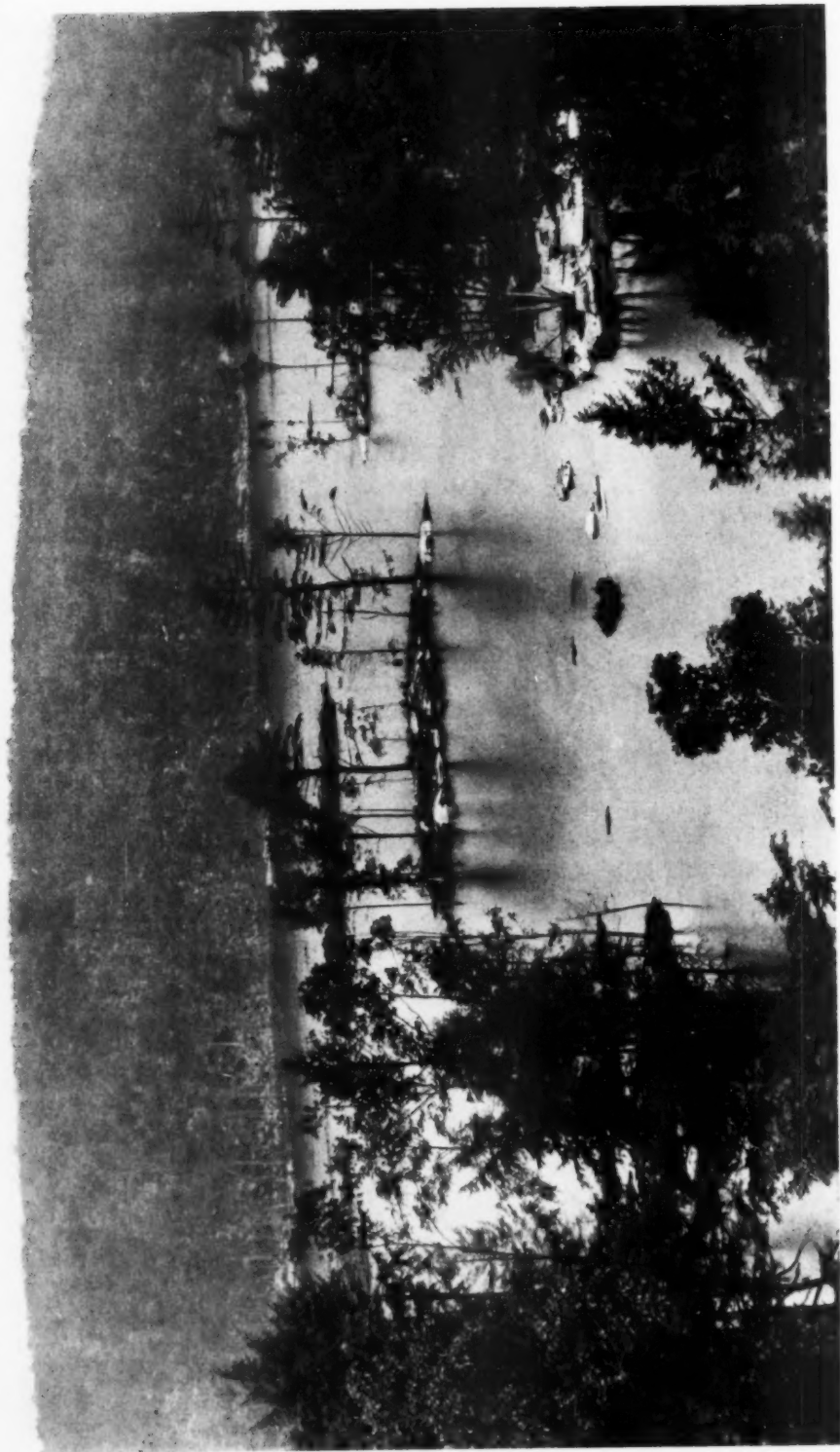
given by the legislature negotiations were begun with the quarry owners, and by fall an agreement was made with them by which they were to shut down their quarries and sell the property for \$135,000. Only \$10,000 was available, so a contract was made with the quarry people to put down \$10,000 on account of the purchase, with an understanding that they would not open again until the first of the following autumn. It was then determined that all that part of the Palisades which was not yet destroyed could be bought for \$400,000, and individuals were approached for the \$125,000 required for the first purchase, the condition being that the legislature should give the \$400,000 with which to buy the rest of the Palisades, and thus prevent other quarries from being opened later. The late J. Pierpont Morgan generously provided the initial \$125,000, and the State finally provided the other \$400,000. Then began the opening up of the cliffs, the planning of an immense park, and arrangements for getting out into the open country beyond.

The west bank of the river, between Nyack and the Ramapo Hills and the Highlands of the Hudson, is a wonderful country. It is here that a tremendous scheme of park development is under way, made possible in the first instance by a gift of a million dollars and ten thousand acres of land by Mrs. E. H. Harriman.² Great difficulty was experienced in securing the quarries north of Nyack, but all except one have now been obtained. The price asked for that one is \$2,320,000.

The advantage of this park for recreation is scarcely to be overestimated. The cliffs are thought to be perpendicular. This is far from true. There is as much level land in the strip of territory from Fort Lee to the end

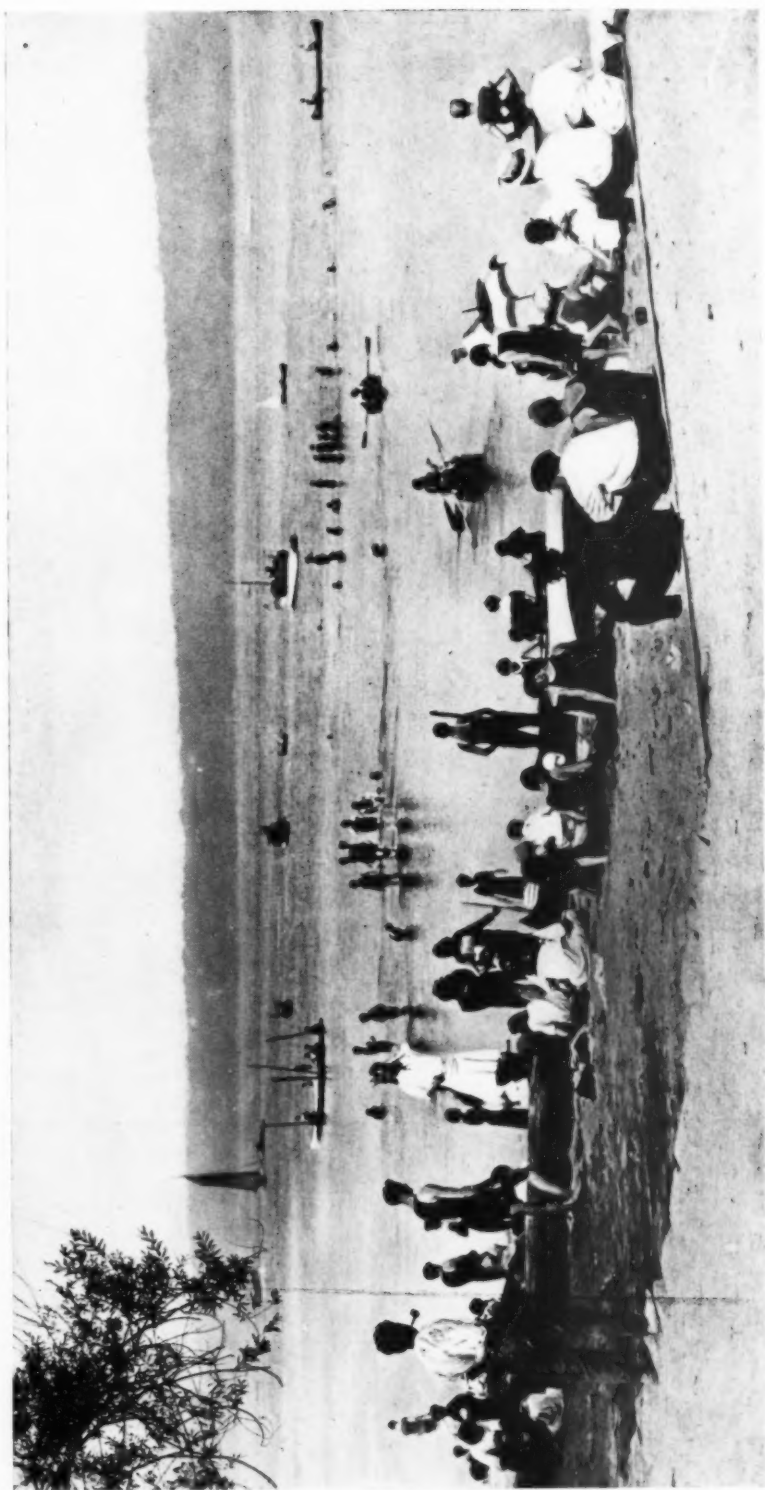
¹ At the twenty-first annual meeting of the American Scenic and Historic Preservation Society, held, with the cooperation of the American Museum of Natural History, at the Museum building on Friday evening, January 21, 1916, the principal speaker was the Honorable George W. Perkins, president of the Palisades Interstate Park Commission and one of the vice presidents of the Society. With the aid of stereopticon views Mr. Perkins gave the audience the fullest popular exposition of the work of the Palisades Interstate Park Commission that has been made since the commission was organized fifteen years ago. It is probable that few of his hearers had realized the progress made in the development of this great mountain and riverside park of 22,000 acres.

² This was the nucleus of five and one-half million dollars raised for the work in one special movement. One million was given by Mrs. Harriman; one and one-half millions by Mrs. Sage and Messrs. Morgan, Rockefeller, Vanderbilt, Stanley, Perkins, Baker and others; two and one-half millions by the State of New York; and half a million by the State of New Jersey. This, added to a million and one-half provided by New York and New Jersey and private contributors at other times, has given the commission about seven million dollars thus far.



ARTIFICIAL LAKE IN HARRIMAN PARK

Fifteen years ago, because of the destructive work of various quarries along the Hudson, the Palisades Interstate Park Commission was created by the legislatures of New Jersey and New York. Today a great riverside and mountain park of 22,000 acres is under development, through the work of this commission, and through funds provided, first by the late J. Pierpont Morgan and the two state Governments represented, and more recently by Mrs. E. H. Harriman and Messrs. Rockefeller, Vanderbilt, Stanley, Baker, and Morgan. New York may be proud that the Hudson river front retains its natural grandeur notwithstanding proximity to one of the world's greatest cities. It is proposed to name this body of water "Harriman Lake," in memory of the late Mr. E. H. Harriman.



SCENE ON THE BEACH NORTH OF ENGLEWOOD

Narrow beaches, strewn with rocks, have been widened, cleared, and filled in. Upwards of a million people gained healthful recreation in the park last year; and undoubtedly these many miles of cliffs and woods, mountain lakes and streams will become of increasing benefit each year to the millions of people who work in New York City and must make their homes there



DRIVEWAY IN HARRIMAN PARK AFTER AN ICE STORM

There is much splendid timber on the Palisades. The Interstate Park Commission, during the last ten years of its service, has done much forestry work in the inland stretches of the park, looking to permanence of the woodlands for the future, and utilizing all timber removed for present building operations — for docks, boats and boathouses, inns and forest's cabins, seats, tables and swings



LAKE, INN, AND PLAY GROUND AT BEAR MOUNTAIN

At Bear Mountain, six miles south of West Point, the commission has built a steamboat dock and a picturesque inn; it has also constructed an automobile road through the Bear Mountain grounds and thence southeastward to Tuxedo. The "Half Moon" (in replica) in which Henry Hudson originally explored the river, is at anchor at the Bear Mountain dock



Boy scouts' camp and forester's cabin near a lake in Harriman Park

Basin on west side of Dyckman Street ferry, built to accommodate small boats and canoes. At present the large steamers make the river dangerous for light craft. A part of the automobile road up the cliff is also shown

of the Palisades as there is in Central Park. Quite a number of acres are sufficiently level to make camping enjoyable, and three thousand permits for tents were issued last year.

Before the commission went to work, the condition of the beaches, narrow and strewn with rocks and stones from the cliffs above, left very much to be desired, from the point of view of camping, boating and swimming. Blasting has been done to get rid of jagged rocks, riprap has been laid along the water's edge, and the beaches have been widened, cleared, and filled in with broken stone and cinders. Docks have been built to provide safe landing places for small boats, and basins also in which they may be protected from the swell of the large steamers. Paths, stairs, and in some cases roads, have been constructed up the cliff, connecting with highways on the top of the Palisades.

From the foot of Dyckman Street on Manhattan Island to the park on the west side of the river, the commission has established a ferry. At the ferry landing in the park it is making an important development, including a dock, and a basin enclosed by a bulkhead. The basin is to be arranged so that small boats can enter through a seventy-five foot entrance and anchor inside for a short stay. From this point an automobile "trail" is being built running northward to a point opposite Yonkers.

From the same ferry landing opposite Dyckman Street, a remarkable road has been built up to the top of the Palisades—here about four hundred feet above the river—connecting with the road to Englewood. This road is carried up a steep grade by means of great loops, the roadway being supported by massive walls of masonry.

There is much splendid timber on the Palisades, and for the past ten years the commission has been doing forestry work. Undergrowth has been cleared and wood cut out, and, since all the work is done by the commission's own organization, there is no waste. All buildings are made from logs taken out of the forest by the forestry department.

One of the finest developments in the park is at Bear Mountain, six miles south of West Point. At the waterfront a steamboat dock has been built which accommodates the largest boats on the river. At this dock is anchored the replica of the "Half Moon"—the vessel in which Hudson explored the river—

which was given to the State of New York by the Dutch people during the Hudson-Fulton celebration in 1909. Bear Mountain Inn is a picturesque restaurant building, and near it is Highland Lake. In the woods around the lake are tables for picnic parties. From Bear Mountain Inn, a road leads northward to West Point.

It is at the northern end of the park that the most extensive developments have been possible. A special study was made of the land given by Mrs. Harriman, particularly with regard to its watershed, and it was found that it would be possible to build a great many lakes of from twenty-five to seven hundred acres extent, and to make them look perfectly natural owing to the foothills and the streams. This work is now in progress. Stumps of trees have been burned and dug out and dams built, and in one place where a year ago was only a little bog, will be next year one of the most beautiful lakes in New York.

Through the Bear Mountain grounds and thence southeastward to Tuxedo the commission has built an automobile road, very largely with native help—men who have lived all their lives under the foothills of the west bank of the Hudson. At several places along the road artificial lakes have been made by damming streams, and in two or three years it will be possible to travel by boat to this part of the park. There is a very large amount of water in this section of country and it is hoped some day to make it a source of revenue by selling water to near-by towns.

The total area of this great mountain and riverside park is twenty-two thousand acres, a glorious heritage of picturesque meadows and forests, rocks and crags, with alluring bridle paths, little streams and cascades, with vistas of distant hill and river, and with a considerable flower and bird life.

The commission hopes eventually to own its own excursion boats from the Battery. Eight million dollars has been spent; eighty million is not too much still to spend, for it is impossible to overestimate the amount of work that can be done on the west side of the Hudson, where land has as yet a low price compared with that on the New York side. Already hundreds of thousands of people annually are using the park for healthful recreation, and it has almost limitless possibilities of future benefit to the millions of inhabitants of the largest city in the world.

Museum Notes

SINCE the last issue of the JOURNAL the following persons have become members of the Museum:

Life Members, MESSRS. CHARLES E. POTTS, ROBERT D. STERLING and MASTER WALTER GRAY CRUMP, JR.;

Annual Members, MRS. G. LISTER CARLISLE, JR., MRS. CLARENCE MORGAN CODDINGTON, MRS. P. L. FISHER, MRS. FURMAN V. GAINES, MRS. GEORGE INGRAHAM, MRS. FREDERIC W. JACKSON, MRS. PITNEY JOHNSON, MRS. G. E. KISSEL, MRS. FREDERICK J. KÜHNE, MRS. HENRY LILLY, MRS. HUGH ROSS MACKENZIE, MRS. ROBERT RIDGWAY, MRS. HILBORNE L. ROOSEVELT, MRS. JESSE ST. JOHN, MRS. JOHN B. SOLLEY, JR., MRS. H. B. TILLOTSON, MRS. HENRY S. WARNER, MRS. J. KEARNY WARREN, MISSES MARGARET S. KINGSFORD, ELSIE B. KOHN, and ELIZA SHARDLOW, DR. W. A. BASTEDO, DR. HARLOW BROOKS, DR. HENRY S. PATTERSON and MESSRS. G. LISTER CARLISLE, JR., ROLAND R. CONKLIN, H. E. ECKSTEIN, M. MAURICE ECKSTEIN, WILLIAM G. GASTON, SAMUEL P. GOLDMAN, ABRAHAM HARRIS, R. C. LEFFINGWELL, OSCAR R. LICHTENSTEIN, JOSEPH L. LILIENTHAL, CHARLES S. MCCULLOH, LAWRENCE PRIDDY, ARNOLD L. SCHEUER, HERBERT B. SHONK, ABEL I. SMITH, JR., WILLIAM H. STRAWN, CHARLES EDW. ROBINSON and C. P. STALLKNECHT.

MR. KNUD RASMUSSEN, the Danish explorer, will sail from Denmark on April 1 for Greenland, in his ship the "Kap York." He will carry mail for the members of the Crocker Land party now at Etah, and also for Dr. E. O. Hovey, in charge of the relief ship "Cluett" in North Star Bay. Although no fears are felt for the safety of the two expeditions, in order to cover all contingencies, arrangements have been made with Mr. Rasmussen to extend to either or both of the parties such assistance as he may find necessary, and should the ship "Cluett" have been rendered unseaworthy through ice crushing in Wolstenholme Sound, the parties will return on the "Kap York" by way of Denmark. The Danes are expert navigators and know this coast better than any other people, and the Museum is fortunate in being able to place this matter in Mr. Rasmussen's hands.

THE American Museum's Asiatic Zoölogical Expedition has been fortunate in securing the services of Mr. Edmund Heller, the well-known zoölogical collector, who has recently returned from South America after a year's work with the Yale University Peruvian Expedition. Mr. Heller has had a varied field experience in many parts of the world, perhaps his best-known expedition work being that with the Roosevelt African Expedition. He will take charge of the collecting of small mammals on the Museum's expedition to China.

PRESIDENT OSBORN is preparing to deliver two lectures on "The Origin and Evolution of Life on the Earth," before the National Academy of Sciences at its spring meeting, April 17-19, in Washington. In these lectures he will describe some of the discoveries made through the explorations of the American Museum of Natural History during the past twenty-five years, since the department of vertebrate palæontology was established.

These lectures constitute the fourth course of the Hale lectures, the first of which was delivered by Sir Ernest Rutherford, F. R. S., in April, 1914, under the title "The Constitution of Matter and the Evolution of the Elements."

The second was delivered by Dr. William Wallace Campbell, director of the Lick Observatory, at the Chicago meeting of the Academy, December, 1914, under the title "The Evolution of the Stars and the Formation of the Earth." The third course of lectures of this series was delivered by Professor T. C. Chamberlin, in April, 1915, on "The Evolution of the Surface of the Earth." Two other courses are to follow Professor Osborn's, one on "The Cellular Basis of Life," and one on "The Evolution of Man." The foundation of the series was a gift to the National Academy of Sciences, by the children of William Ellery Hale, in memory of their father. When finished, the entire course of lectures is designed to give a complete history of the modern aspects of the evolution theory, from the nebular stage of the universe up to man. It is then designed to bring the lectures together in a single volume.

THROUGH the generosity of Mr. Ogden Mills, the Museum library has recently acquired an interesting original manuscript entitled "The Butterflies of North America; Whence they come, Where they go, and What they do," by Titian Ramsey Peale. This work has never yet been published except possibly for a single small installment which seems to have appeared in 1883. Its author, who was born in Philadelphia in 1800 and died in the same city in 1885, was a member of the Academy of Natural Sciences of Philadelphia, of the American Philosophical Society of Philadelphia, and of the Philosophical Society of Washington, D. C., and accompanied the United States Exploring Expedition to the Antarctic under Lieutenant Wilkes in 1838-42. His collection of Lepidoptera is still preserved at the Academy of Natural Sciences of Philadelphia, partly in the original boxes. The present manuscript consists of nearly four hundred pages of neatly written descriptive matter and is accompanied by three volumes of original colored drawings, made by Mr. Peale, showing the upper and under side of each species and, in many cases, figures of the larva, chrysalis, and food plant. These drawings are for the most part excellent, covering mainly the *Rhopalocera*, only a few species of *Heterocera* being dealt with. The manuscript is divided into parts, of two to six pages each, dealing, in nearly all cases, with a single species, and many uncolored drawings accompany the text.

This work has considerable historic and scientific value, containing, besides original descriptions of new species, much valuable matter dealing with early stages in their life history. From a pamphlet accompanying the first installment it was evidently originally intended to publish the whole work by subscription. It is possible that its publication may now be undertaken by the American Museum of Natural History.

CHARLES FALKENBACH, of the laboratory staff in the Museum's department of fossil vertebrates, died suddenly of heart failure on March third as he was about to set out from his home for the Museum. Mr. Falkenbach was one of the most skillful preparators in the department, with which he had been connected for thirteen years. The preparation of fossil skeletons is a task requiring long training, as well as natural dexterity, patience, and good judgment. To remove the hard

stony matrix without injury to the fragile and delicate bony structures preserved within it, to piece together all the scattered fragments and undo as far as may be the destructive effects of weathering, to restore the missing portions and to devise means for strengthening the prepared specimens so that they will bear handling and can be articulated and mounted for exhibition, is often more difficult and tedious than the discovery and collecting of the fossil skeleton, and is equally deserving of credit and commemoration. The numerous specimens prepared by Mr. Falkenbach during his long connection with the Museum, and especially the very ancient fossil reptiles and amphibians from the Permian formations of Texas and South Africa, stand as an enduring monument to his industry and skill. The conscientious accuracy in the details of their preparation will be most appreciated by the scientific men from all over the world, who have occasion to study them. At the time of his death Mr. Falkenbach was engaged upon the preparation of the skull and jaws of a Tertiary ancestor of the *Mastodon*, and had succeeded in extracting, perfectly preserved, from a flinty hard rock in which they were imbedded, the delicate bony structures of the under side of the skull, which furnish to the anatomist important and conclusive evidence as to the exact relationships of these animals and the true course of their evolutionary history. Mr. Falkenbach is a loss to the Museum and cannot well be replaced. To his associates in the department the loss is a personal one, that of a valued friend and collaborator.

THE American Museum will have this year three fossil-hunting expeditions in the West. One, in charge of Mr. Barnum Brown, will continue the search for Cretaceous dinosaurs, working southward from the rich field on the Red Deer River, Alberta. Mr. Brown's work on the Cretaceous dinosaurs has resulted in securing for the Museum skulls and skeletons of many remarkable dinosaurs known hitherto only from fragments, if at all. He has distinguished three well-defined stages, or successive faunas, in their geologic evolution. His aim now is not merely to enlarge these faunas, but also to trace their extension and changes in character from place to place, and to find intermediate or still older stages. In this way we shall be able to trace the evolutionary history of American dinosaurs in



WHEN WHOOPING CRANES LIVED IN MINNESOTA

[*Series of Recent Museum Groups*]

The once abundant whooping crane is now nearly extinct. The few remaining birds breed in the interior of British Columbia, the species not having been known to nest in the United States since 1894. The new whooping crane group in the American Museum, represents two adult birds and one young bird on the shores of Heron Lake, southwestern Minnesota, a region they are known to have inhabited, and where studies for the group were made. The three specimens for the group were presented to the Museum by Mr. Carl E. Akeley

the Cretaceous, in the same way that we have traced, or are tracing, the evolution of American mammals in the Tertiary period.

The second expedition, in charge of Mr. Walter Granger, will search for mammals of the Eocene or older Tertiary. A number of promising localities scattered through the Rocky Mountain region from New Mexico to Wyoming will be investigated, with the hope of securing additional or better specimens of the rarer fossil mammals. The general problem here is the derivation and early history of these ancient races of quadrupeds, to find out when they first appeared, and whence, and to secure skulls and skeletons of those which are known only by jaws and teeth, and whose exact relationships are often doubtful. We may hope to find, or to recognize, ancestors of various later Tertiary or modern animals whose descent has not been traced back so far as this.

The third expedition, in charge of Mr. Albert Thomson, will devote itself to the later Tertiary mammals, and its field of work will be in central Nebraska. Its especial aim is to secure more complete material from the Upper Miocene and Pliocene formations, and to bridge the gap between the well-known faunas of the Oligocene and older Miocene below, and the Pleistocene above. By supplying skulls and skeletons representing the Pliocene stages in the ancestry of various mammalian races — horses, camels, deer, mastodons, etc., it will clear up various puzzling problems and disputed points in the geologic history of each race.

A NEW group has recently been installed among the habitat bird groups on the third floor of the American Museum, showing three representative specimens of the whooping crane in winter habitat. These beautiful migratory birds, the largest and most striking of all North American species, formerly ranged from northern Mackenzie in Canada, through the eastern half of the United States as far south as central Mexico. The beauty of their feathers and the fact that the young birds are exceedingly good to eat, have caused them to be hunted until they are now almost extinct, their size and white plumage rendering them an inevitable mark. A few still exist in certain parts of Canada, migrating to Texas; but the many flocks that yearly used to leave their northern breeding places to winter in the southern states are, like the

passenger pigeon and Labrador duck, a memory of the past. Audubon describes these birds as arriving in the south "about the middle of October or beginning of November, in flocks of twenty or thirty individuals, sometimes of twice or thrice that number, the young by themselves, but closely followed by their parents." They wintered in the south "seldom returning northward until about the end of April or beginning of May." "They are found on the edges of large ponds supplied with rank herbage, on fields or savannahs, now in swampy woods and again on extensive marshes."... "While migrating they appear to travel both by night and by day, their power of flight being such as to render them regardless of the winds."

The two adult birds and one young bird composing the Museum's group were obtained twenty-five years ago by Mr. Carl E. Akeley at Carrington in North Dakota and were presented by him to the Museum. Mr. Akeley describes a flock of these birds on the wing as a most beautiful sight, with white plumage opalescent in the sun, while their wild calls fill the air. The young birds are reddish brown in color changing to bluish gray and ultimately to white, a circumstance which at one time caused them to be regarded as a different species. Specimens of the young bird are now rare.

The group has been built in the Museum's taxidermy studio under the direction of Dr. Frank M. Chapman and Mr. Carl E. Akeley. Mr. Louis Agassiz Fuertes, the well-known painter of birds, has directed the grouping, posing and setting of the specimens, while the background was painted by Mr. Hobart Nichols. Since the birds are represented in an autumn scene it has been possible to make use entirely of natural herbage for the setting, instead of having recourse to wax as is generally necessary.

THE American Museum has been presented by Mr. Archibald Harrison with a pure albino Virginia deer, recently obtained by him at Bull's Island, South Carolina. The animal is to be mounted by Mr. James L. Clark and will form a valuable addition to the Museum's series illustrating color variation.

THE C. H. Roberts collection of aquatic Coleoptera, which is one of the best in this country, has recently been purchased by the Museum, with the aid of local entomologists who contributed to a fund for this purpose.

THE so-called "elephant-eared" sunfish, or headfish, which has recently attracted attention as having been taken in Florida, is the species of which the record specimen, with a width of 10 feet, may be seen mounted in the hall of fishes of the American Museum of Natural History. The Florida specimen was seven and one-half feet long, eight feet wide, and three feet thick, — which is not an unusual size. The creature is remarkable in that the tail part of the body is so little developed that the whole fish has the form of an ordinary fish's head. Mr. Ambrose Monell, who took the Florida fish, has had the brain dissected for the collections of the American Museum.

This sunfish is only rarely found off the Atlantic Coast, being more common off the coast of southern California. It is seen swimming at the surface, more or less on its side, with the tall back fin projecting out of the water. Little is known of its life habits and method of feeding.

An exhibition of Alaskan paintings by Mr. Leonard M. Davis, will be on view in the west assembly hall of the Museum from April

20 to May 14 inclusive. In order to afford an opportunity of seeing these paintings to those who are occupied during the day, the exhibition will be open from 7 to 10 P.M. on the evenings of Saturday, April 22; Tuesday, April 25; Saturday, April 29; Tuesday, May 2, and Saturday, May 6. After May 15 an exhibition of paintings, representing life and scenery at the bottom of the sea, by Mr. Zarh H. Pritchard, will be on view. The studies for these interesting pictures were made actually on the sea bottom, among the islands of the Pacific and off the California coast, and at some time during the exhibition Mr. Pritchard will give an illustrated account of his work.

THROUGH the kindness of Dr. Guy Pilgrim, acting director of the Indian Geological Survey, the American Museum has received casts of portions of the jaw of the anthropoid ape *Sivapithecus indicus*, fossil remains of which are found in the Tertiary deposits of the Siwalik Hills. The Museum possesses casts of all the principal types of extinct apes from Europe and Asia and the specimen just received adds an important genus to the series.

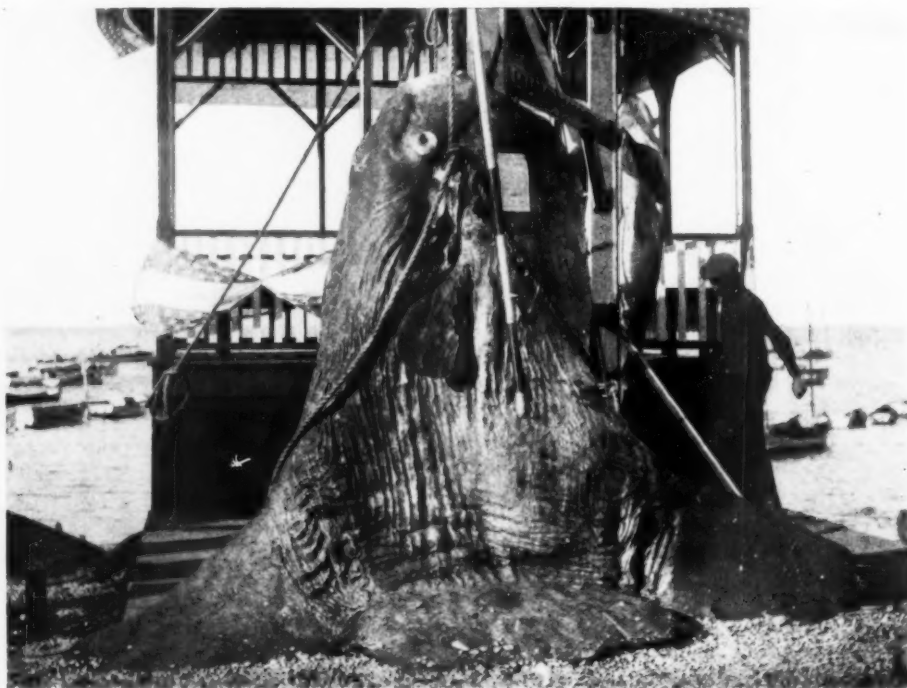


Photo by Mr. H. J. Parker

"Elephant-eared" sunfish, or headfish (*Mola mola*) caught in Pacific waters off Santa Catalina, southern California — the region in which it is most commonly found. The species has recently attracted considerable attention through the unusual event of its having been taken off the Florida coast. A record specimen may be seen mounted in the hall of fishes of the American Museum of Natural History

The American Museum of Natural History

Seventy-seventh Street and Central Park West, New York City

Open free to the public on every day in the year.

The American Museum of Natural History was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people. It is dependent upon private subscriptions and the fees from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world. The membership fees are,

Annual Members.....	\$ 10	Patrons.....	\$1,000
Sustaining Members (annually)...	25	Associate Benefactors.....	10,000
Life Members.....	100	Associate Founders.....	25,000
Fellows.....	500	Benefactors.....	50,000

Guides for Study of Exhibits are provided on request to members and teachers by the department of public education. Teachers wishing to bring classes should write or telephone the department for an appointment, specifying the collection to be studied. Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

The Museum Library contains more than 60,000 volumes with a good working collection of publications issued by scientific institutions and societies in this country and abroad. The library is open to the public for reference daily — Sundays and holidays excepted — from 9 A. M. to 5 P. M.

The Technical Publications of the Museum comprise the *Memoirs*, *Bulletin* and *Anthropological Papers*, the *Memoirs* and *Bulletin* edited by J. A. Allen, the *Anthropological Papers* by Clark Wissler. These publications cover the field and laboratory researches of the institution.

The Popular Publications of the Museum comprise the *JOURNAL*, edited by Mary Cynthia Dickerson, the *Handbooks*, *Leaflets* and *General Guide*. The following list gives some of the popular publications; complete lists, of both technical and popular publications, may be obtained from the Librarian.

POPULAR PUBLICATIONS

HANDBOOKS

- NORTH AMERICAN INDIANS OF THE PLAINS. By Clark Wissler, Ph.D. *Paper*, 25 cents; *cloth*, 50 cents.
 INDIANS OF THE SOUTHWEST. By Pliny Earle Goddard, Ph.D. *Paper*, 25 cents; *cloth*, 50 cents.
 ANIMALS OF THE PAST. By Frederic A. Lucas, Sc.D. *Paper*, 35 cents.

ILLUSTRATED GUIDE LEAFLETS

- GENERAL GUIDE TO THE COLLECTIONS. New edition issued December, 1914. *Price*, 25 cents.
 THE COLLECTION OF MINERALS. By Louis P. Gratacap, A.M. *Price*, 5 cents.
 NORTH AMERICAN RUMINANTS. By J. A. Allen, Ph.D. *Price*, 10 cents.
 THE ANCIENT BASKET MAKERS OF SOUTHEASTERN UTAH. By George H. Pepper. *Price*, 10 cents.
 PRIMITIVE ART. *Price*, 15 cents.
 THE BIRDS OF THE VICINITY OF NEW YORK CITY. By Frank M. Chapman, Sc.D. *Price*, 15 cents.
 PERUVIAN MUMMIES. By Charles W. Mead. *Price*, 10 cents.
 THE METEORITES IN THE FOYER OF THE AMERICAN MUSEUM OF NATURAL HISTORY. By Edmund Otis Hovey, Ph.D. *Price*, 10 cents.
 THE HABITAT GROUPS OF NORTH AMERICAN BIRDS. By Frank M. Chapman, Sc.D. *New edition in course of preparation*.

- THE INDIANS OF MANHATTAN ISLAND AND VICINITY. By Alanson Skinner. *Price*, 20 cents.
 THE STOKES PAINTINGS REPRESENTING GREENLAND ESKIMO. *Out of print*.
 BRIEF HISTORY OF ANTARCTIC EXPLORATIONS. *Price*, 10 cents.
 TREES AND FORESTRY. By Mary Cynthia Dickerson, B.S. *A new edition in course of preparation*.
 THE PROTECTION OF RIVER AND HARBOR WATERS FROM MUNICIPAL WASTES. By Charles-Edward Amory Winslow, M.S. *Price*, 10 cents.
 PLANT FORMS IN WAX. By E. C. B. Fassett. *Price*, 10 cents.
 THE EVOLUTION OF THE HORSE. By W. D. Matthew, Ph.D. *Price*, 20 cents.
 MAMMOTHS AND MASTODONS. By W.D. Matthew, Ph.D. *Price*, 10 cents.

REPRINTS

- THE GROUND SLOTH GROUP. By W. D. Matthew, Ph.D. *Price*, 5 cents.
 METHODS AND RESULTS IN HERPETOLOGY. By Mary Cynthia Dickerson, B.S. *Out of print*.
 THE WHARF PILE GROUP. By Roy W. Miner, A.B. *Price*, 5 cents.
 THE SEA WORM GROUP. By Roy W. Miner, A.B. *Price*, 10 cents.
 THE ANCESTRY OF THE EDENTATES. By W. D. Matthew, Ph.D. *Price*, 5 cents.



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Lions shot by Theodore Roosevelt on Loita Plains, British East Africa. Group prepared by Mr. G. B. Turner in the United States National Museum